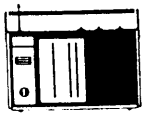
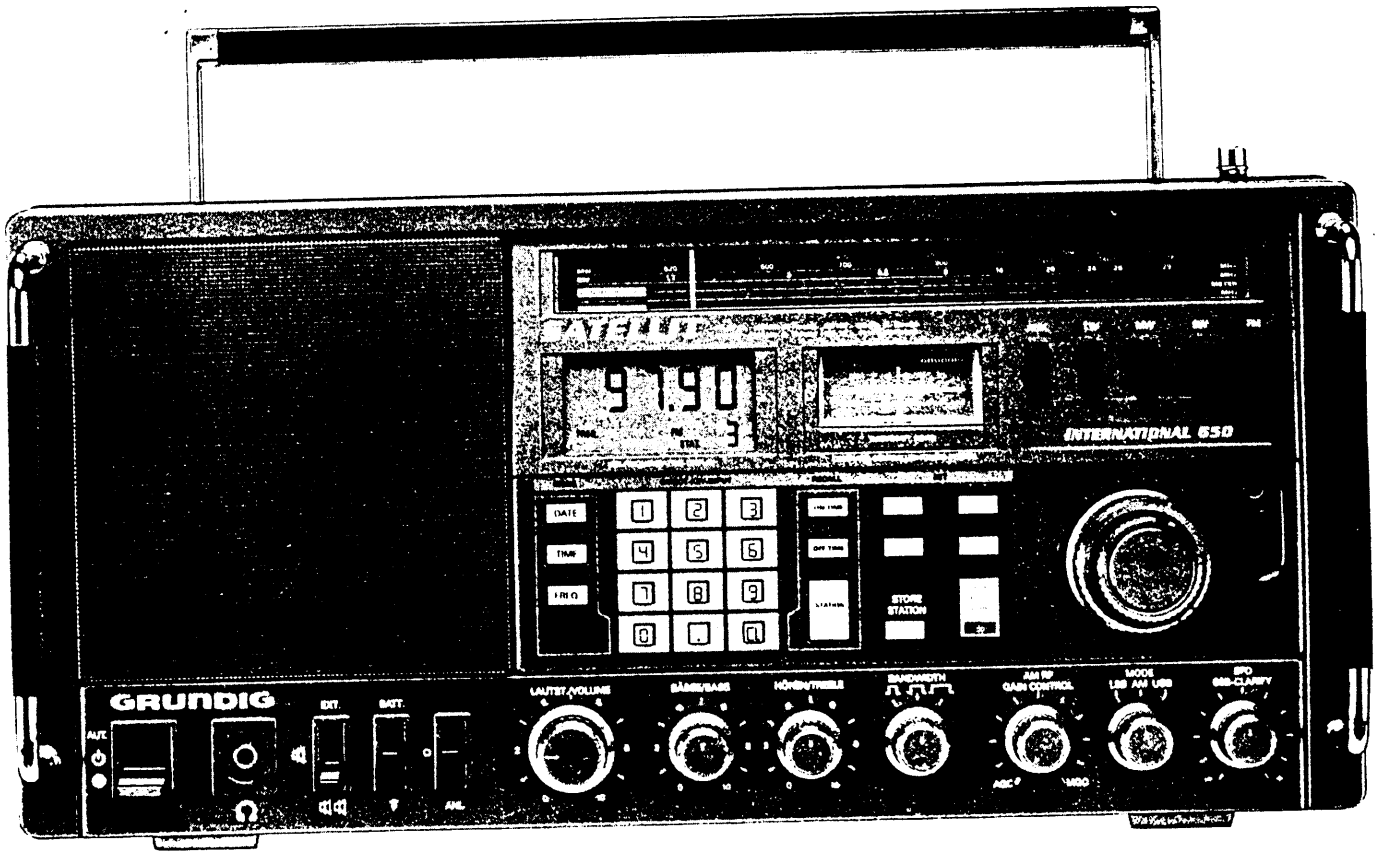
GRUNDIG SERVICE MANUAL



Ⓓ Btx * 32700 #

10/86

Satellit 650



Bei Eingriffen Schutzmaßnahmen für MOS-Bauteile beachten!

N.B. When carrying out repairs, observe MOS precautions!

1. Allgemeine Hinweise

Alle Spannungseinstellungen erfordern die Verwendung eines entsprechend genauen Instruments (z.B. Grundig DM 14), wobei die angegebenen Spannungen mit ihren Toleranzen mit Sicherheit eingehalten werden müssen.

Das Gerät muß auch nach der Reparatur die Sicherheitsbestimmungen nach VDE 0860 erfüllen. Für SK- und CH-Geräte muß zusätzlich zwischen Netz- und berührbaren Teilen eine Spannungsfestigkeit von $3\,kV_{eff}$ gewährleistet werden.

Damit die FTZ - Vorschriften eingehalten werden, dürfen keine Masseverbindungen geändert werden.

Bei defekter Displaybeleuchtung Digitalplatte ausbauen und die Lampen LA 1 und LA 2 von hinten aus den Fassungen drücken.

1. General Notes

All voltage adjustments have to be made with precisely working instruments (e.g. GRUNDIG DM 14) to ensure that the voltages and their tolerances are in keeping with the specified values.

After repair the set has still to meet the IEC 0860 safety requirements. Additionally, sets for the Scandinavian and Swiss markets have to show an electric strength of 3kV rms between mains supply and touchable parts.

For reason of FTZ regulations (Telecommunications Head Office) it is not allowed to change the ground connections.

In case of a defective display illumination remove the digital PCB and remove the lamps LA 1 and LA 2 from their sockets by pressing them from the back.

2. Ausbauhinweise

Chassis-Ausbau

1. Netzkabel ziehen, Batteriefachdeckel abnehmen und eventuell eingesetzte 9V-Batterien bzw. Dryfit-Accu (nicht Uhrenbatterien) herausnehmen.
2. Abstimm- und Drehknöpfe abziehen und Gerät auf die Abstützbügel legen.
3. Drei Kreuzschlitzschrauben am Gehäuseboden herausdrehen und Rückwand unten anheben und über die obere Kante abheben.
4. Chassis aus dem Gehäusevorderteil nehmen.

Chassis-Einbau

5. Bei der Montage ist darauf zu achten, daß sich die Kippschalter in Mittelstellung befinden, die HF - ZF - Platte richtig in den Führungsleisten liegt, und daß beim Schließen der Rückwand Buchsen und Schalter in die dafür vorgesehenen Durchbrüche finden.

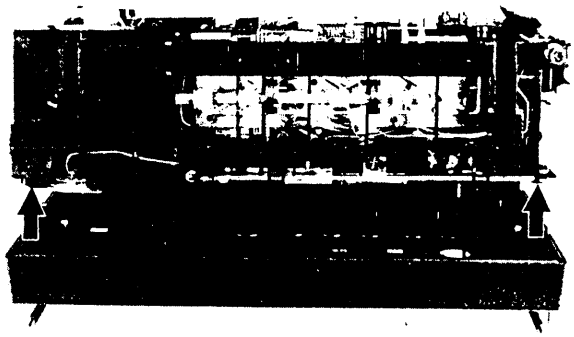
2. Disassembly

Disassembly of Chassis

1. Unplug the mains cable, remove the battery compartment cover and possibly inserted 9V batteries or dryfit storage battery (not the clock batteries).
2. Pull out the tuning and control knobs and put the set down on its brackets.
3. Loosen the three cross-head screws on the bottom of the set; lift the rear panel and remove it by moving it to the back.
4. Remove the chassis from the front part of the housing

Assembly of chassis

5. When reassembling take care that the toggle switches are in mid-position,that the RF-IF board is correctly positioned in its guides,and that the socket and switches and their respectiv cutouts match when mounting the rear panel.

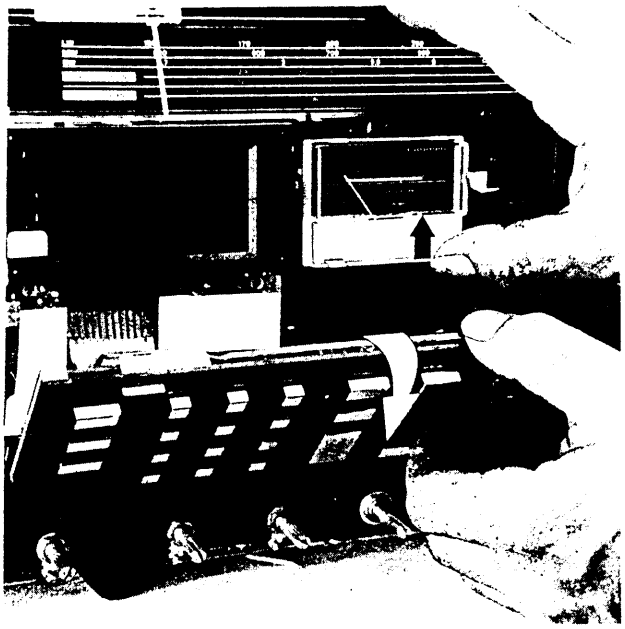


Ausbau der Tastenplatte und des Digitalteiles

1. Rastnase in Pfeilrichtung drücken und Tastenplatte aus der Halterung nehmen

Disassembly of Keyboard Panel and Digital Unit.

1. Push the catch in direction of the arrow and remove the keyboard panel from its mounting.



2. Zwei Rastnasen seitlich aus der Rastung drücken und Digitalteil herausnehmen.

2. Disengage the two catches by pushing them to the left and right, respectively, and remove the digital unit.

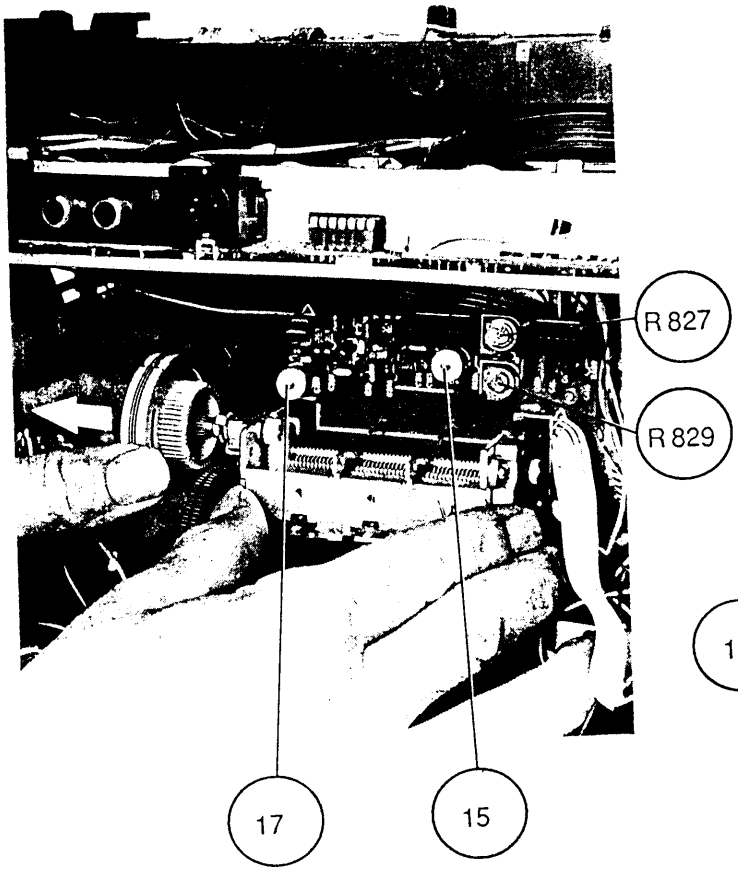
Variometer

Beim Wechsel des Variometers ist auf folgendes zu achten:

1. Ausbau der Tastenplatte und des Digitalteiles wie vorher beschrieben.
2. Drehko im eingedrehten Zustand!
3. Steckverbindungen lösen und vier Leitungen ablöten.
4. Zwei Kreuzschlitzschrauben unterhalb des Anzeigeinstrumentes herausdrehen.
5. Seilrad abziehen und festhalten, nicht verdrehen!
   Mit der anderen Hand Variometer herausnehmen und neues einsetzen.
   Es ist darauf zu achten, daß der Variometerschlitten nicht verstellt wird.
   Auf Markierung achten.

SSB - Variometer

Die Grundeinstellung der Feinverstimmung (SSB-clarify) erfolgt so, daß die Zahnstange bei Anschlag der Welle so weit eingeschoben wird, bis diese Kanten fluchten.



Ausbau der HF-/ZF-Platte

1. Teleskopantenne ausziehen und Leitung ablöten.
2. Skala und Blende entfernen, Leitungen für Instrument- und Skalenbeleuchtung sowie Variometer ablöten.
   Peilantennenplatte herausziehen.
3. Sechs Steckverbindungen lösen und Masseleitung vom Digitalteil (STV803) ablöten.
4. Halterung **A** der HF-/ZF-Platte zurückdrücken und Platte aus den Rastebenen **A** ziehen. HF-/ZF-Platte zur Gehäuse-Oberkante kippen bis die Platte aus den Fixiernasen **B** gleitet.
5. Acht Anschlüsse zur Ferritantenne und vier Leitungen (gelb an 20A, rot an 20B, braun an 32B und grün an 32E) ablöten.
6. Obere Abschirmung öffnen und Bowdenzug lösen. Bei der Montage ist auf die richtige Stellung des Bandbreitenschalters zu achten.

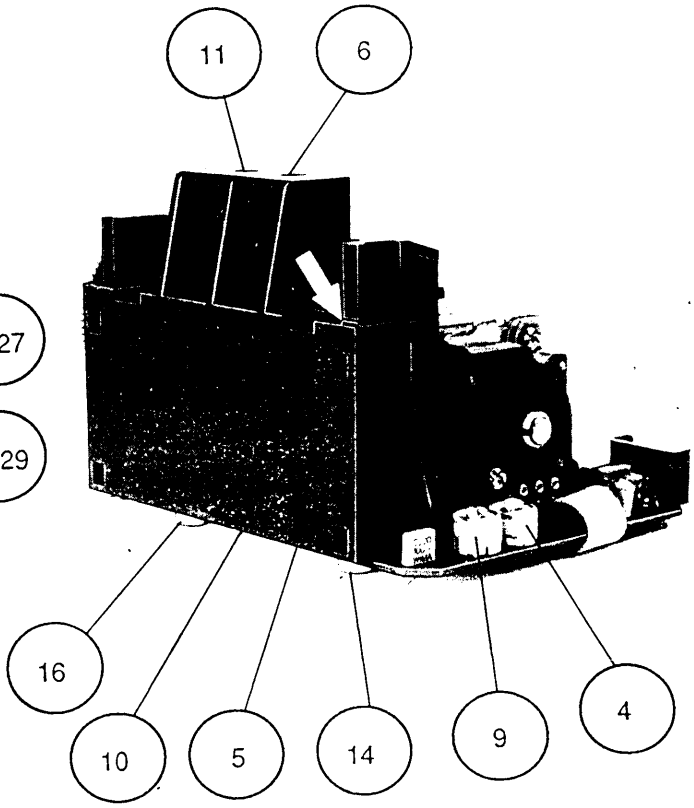
Variometer

Observe the following instructions when replacing the variometer:

1. Remove the keyboard panel and digital unit as described above.
2. Variable capacitor is turned in!
3. Unplug the connectors and unsolder four lines.
4. Loosen the two cross-head screws below the indicating instrument.
5. Remove and hold the cord pulley but do not turn it!
   With the other hand take out the variometer and replace it by a new one.
   Take care not to change the position of the variometer carriage.
   Note the marker!

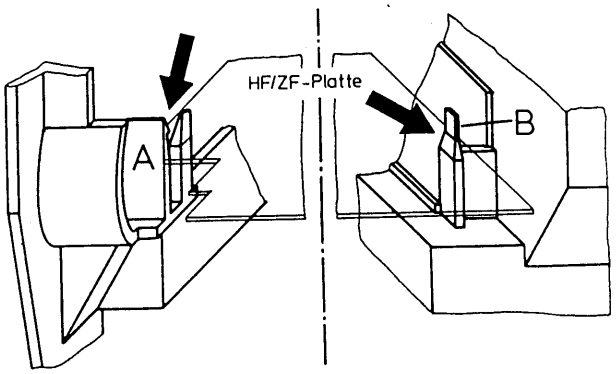
SSB - Variometer

The bandwidth selector switch has to be set to "narrow" for the total AM adjusting procedure.



Disassembly of RF/IF Board

1. Draw out the telescopic antenna and unsolder the line.
2. Remove the scale and the mask, unsolder the lines for instrument and scale illumination as well as the variometer.
   Take out the DF frame board.
3. Loosen six plug-type connections and unsolder the ground line from the digital unit (STV803).
4. Push back holding device **A** from the RF/IF board and remove the board from the surfaces **A**. Move the RF/IF board towards the upper edge of the housing until the board slips from the locating lugs **B**.
5. Unsolder eight connections to the ferrite antenna and four lines (yellow at 20A, red at 20B, brown at 32A and green at 32E).
6. Open the upper shielding and loosen the Bowden wire. Take care that the bandwidth selector is in correct position when mounting the board.



Montage und Schmiervorschrift

Folgende Teile müssen mit Shell Voltol 22 5-10 Vol % Zusatz VM geschmiert werden:

1. AM-Variometer: Alle Lagerstellen und Zahnräder einschließlich Zahnstange des Variometers.
2. Montagerahmen: Die Lagerstellen für Geberrad, Schaltlager, Schaltwelle, Seilrolle und Riemenscheibe (Motor).
3. Die Gleitflächen der Zeigerführung

Das Schmiermittel Shell Voltol 22 ist im Schmiermittelsatz (Sach-Nr. 72003-741.00) enthalten und mit " (▼) " gekennzeichnet.

Bei Austausch der Digital - und der Variometerplatte muß der A/D - Wert neu eingestellt werden.

Die Uhrenfrequenz ist werkseitig auf 32768 Hz ± 0,1 Hz eingestellt (mit C 857).

Bei Austausch von IC 901 muß die Ladespannung kontrolliert werden. Dazu einen 1 kΩ-Widerstand und einen 1000 µF Elko parallel an Ladekontakt und Minus anschließen. Die Ladespannung muß zwischen 9,05 V und 9,25 V liegen. Gegebenfalls R 904 oder R 905 zuschalten.

Mounting and Lubricating Instructions

The following parts have to be lubricated with Shell Voltol 22 5-10 percent by volume VM addition:

1. AM variometer: All bearings and gearwheels including toothed rack of the variometer.
2. Mounting frame: All bearings for the master wheel, switch bearing, switch shaft, cord pulley and pulley (motor).
3. Slide surfaces of the pointer guide.

The Shell Voltol 22 lubricant is included in the set of lubricants (Part No. 72003-741.00) and is marked with (▼)

On replacement of the digital board or the variometer board the A/D value has to be adjusted again.

The clock frequency is preset at the factory to 32768 Hz ± 0.1 Hz (by means of C 857).

Check the charging voltage when replacing IC 901. For this purpose, connect a 1 kOhm resistor and a 1000 µF electrolytic capacitor in parallel to the charging contact and the negative terminal. The charging voltage must be within a range of 9.05 V and 9.25 V. If necessary, connect R 904 or R 905.

ZEICHENERKLÄRUNG	LEGENDE
Meßsender Testgenerator	Frequenzzähler frequency counter
Wobbelgenerator Sweep generator	Digitalvoltmeter Digital voltage meter
Gleichspannungsgenerator DC-Generator	HF-Voltmeter RF-Voltmeter
Kurzschließen short circuit	NF-Voltmeter AF-Voltmeter
Unterbrechung disconnection	Oszilloskop Oscilloscop
Mittelstellung middle position	Drehen nach rechts Tuning to right
Einstellung wiederholen To repeat the adjustment	Drehen nach links Tuning to left
An Masse legen contact to chassis	Rahmenantenne Frame aerial

Abgleichtabelle

Während des kompletten AM - Abgleichs muß der Bandbreitenschalter in Stellung "schmal" stehen.

Reihenfolge der Abgleichpunkte für Komplettabgleich
AM: R 507,I,II,III,IV,V,VI,VII,VIII,IX,X,R 258,R 827,R 829,2,4,7,5,8,6,9,12,10,13,11,15,17,14,16,R 521,R 513, 19,20.

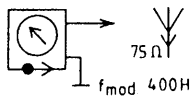
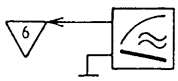
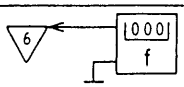
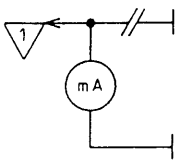
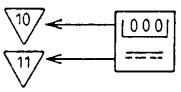
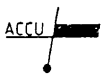
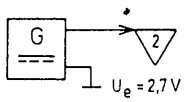
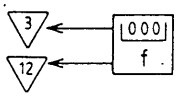
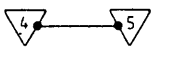
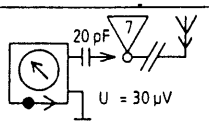
FM: A,B,L,I,C,E,G,D,F,H,R 359.

Alignmenttable

The bandwidth selector switch has to be set to "narrow" for the total AM adjusting procedure.

Sequence of alignment points for complete adjustment.

Abgleich Alignment	Einspeisung Feeding	Meßpunkt Testpoint	Hinweis Notes	Bereich Band	f	Abgleichpunkt Alignment-point	Einstellung Adjustment
Oszillator oscillator		202	8	LW		L 209 (VI)	max.
		202 1000 f				C 275 (VII)	54,05 MHz ± 100 Hz
			äußeres Max. exterior max.		148 KHz	L 205 (2)	1,5 V ± 0,05 V
		107 1000	äußeres Max. exterior max.	FM	87,5 MHz	L 305 (A)	2,1 V ± 0,1 V
					108 MHz	C 315 (B)	25 V ± 1 V
Vor- und Zwischenkreis Aerial-band-pass, ecl.	f_{mod} = 400 Hz / 30%	6	Ant.Presel. ein/on A/D Wert mit Handrad korrigieren/ correct A/D-Position with manual tuning *				
			A/D = 19	LW	160 KHz	C 417 (4)	max.
						L 404 (7)	
			A/D = 199		370 KHz	L 407 (5)	
						C 405 (3)	
			A/D = 106		240 KHz	L 407 (6)	
			A/D = 23	MW	560 KHz	C 414 (9)	max.
						L 402 (12)	
			A/D = 212		1450 KHz	L 406 (10)	
						C 403 (13)	
			A/D = 134		990 KHz	L 406 (11)	
	20pF 7 f_{mod} = 400 Hz / 30%		A/D = 189	SW	23,05 MHz	C 214 (15)	max.
						C 207 (17)	
			A/D = 19		2,05 MHz	L 203 (14)	
						L 202 (16)	
	7 f_{mod} 1kHz Hub ca. 22,5 kHz (20 dB-Abstand, 60/150 Ω) (20 dB-spacing, 60/150 Ω)			FM	88 MHz	L 304 (C)	max.
						L 303 (E)	
						L 302 (G)	
					106 MHz	C 313 (D)	
						C 307 (I)	
						C 303 (H)	
ZF / IF	0,1 µF 502 f_e = 450 kHz	503		SW		F 506 (I)	max.
						F 505 (II)	
						F 504 (III)	
	0,1 µF 501 f_e = 450 kHz		nur in Verbindung mit/only with F 502/ 19203-105.95			F 503 (IV)	sym.
						F 501 (V)	max. + sym.
	201 f_e = 54,5 MHz	6	R 258			F 201 (IX)	max.
						F 202 (VIII)	
					2,05 MHz	R 258 (X)	min.
	75 Ω	601	verstimmen F 305 (F) detune	FM	88 MHz	F 301 (L)	max.+ sym.
			inneres Max. interior max.			F 305 (I)	

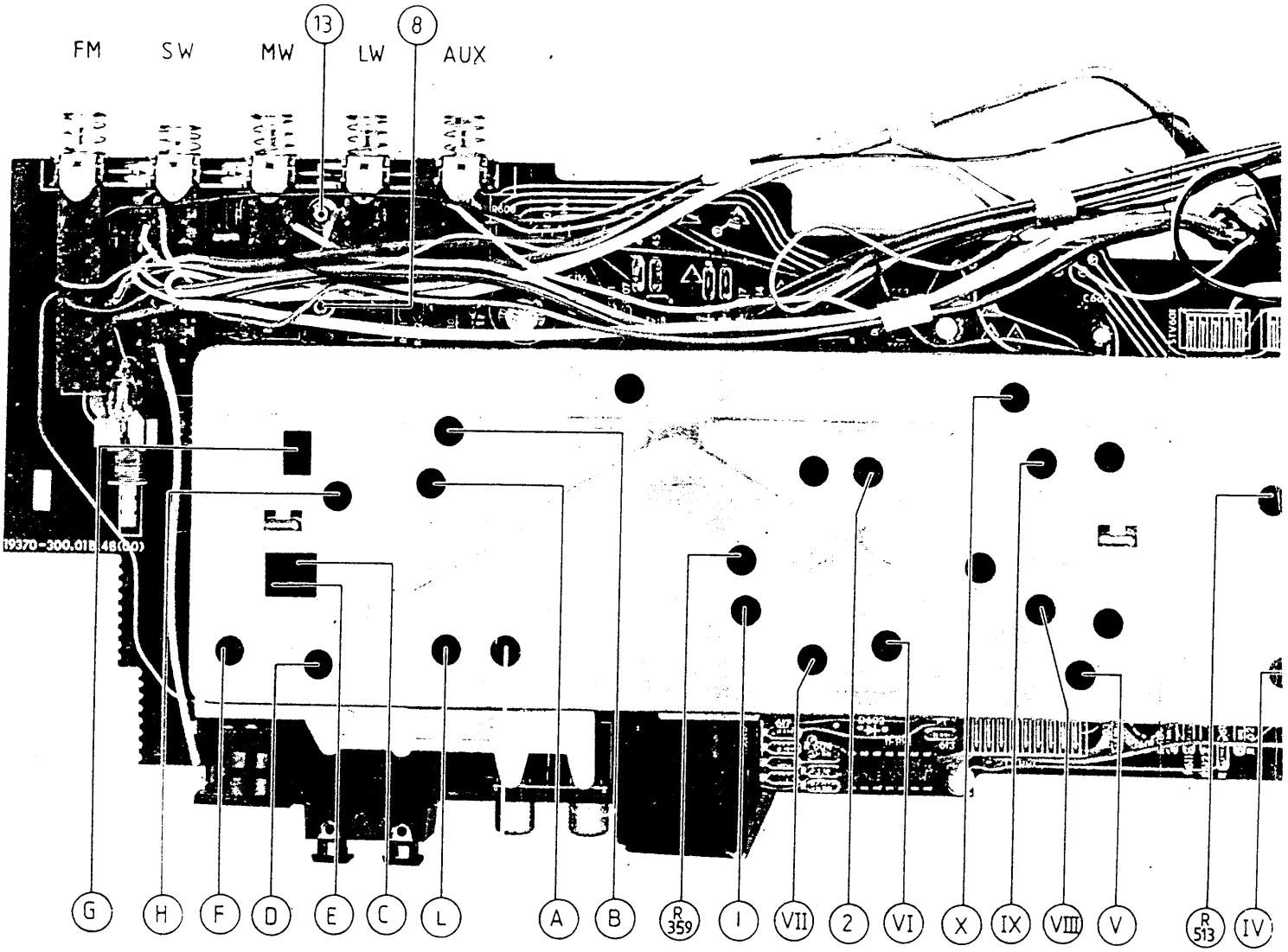
Abgleich Alignment	Einspeisung Feeding	Meßpunkt Testpoint	Hinweis Notes	Bereich Band	f	Abgleich-punkt Alignment-point	Ein-stellung Adjustment
SSB-Teil SSB-unit			Mode: " AM " C 716 (20) SSB-Variometer	SW	22,2 MHz	Tuning	max.
	unmod.		Mode: " USB "			F 703 (19)	Schwebungs-null beat zero
	f_e = 22,2 MHz		**		21,199 MHz	C 716 (20)	1 KHz ± 100 Hz
Arbeitspunkte workpoints	U_{Batt} = 9 V		NF-Ausgang mit 4Ω belasten Load AF-Output with 4Ω R 649	SW		R 676	10 mA ± 1 mA
						R 507	1,0V-1,1V
	U_{Batt} = 7,2 V		Schalter 5,6: switch 5,6: " Batt. "			R 915	
Speicher-spannungs-kontrolle stand by voltage control			Entsprechende Brücke 1,2,3 verbinden corresponding shortcircuit 1,2,3			R 862	Display " Batt. " Display " Time "
	U_e = 2,75 V						
4 MHz - Oscillator						C 814	4 MHz ± 100 Hz
A/D Wandler A/D Transformer			 R827 R829	MW			
			Handab-stimmung Tuning			R 827	Display-wechsel/ change 254 → 255
			Handab-stimmung Tuning			R 829	Display-wechsel/ change 1→0
instrument				SW	22,2 MHz	R 521	Marke 3 mark 3
	U_e = 100 mV					R 513	Marke 9 mark 9
	$U_e \geq$ 1 mV			FM	88 MHz	R 359	Marke 9 mark 9

* Der A/D-Wert wird nach Eingabe der Frequenz und Kurzschließen der Meßpunkte 4 und 5 im Display angezeigt.

* On entering the frequency and short-circuiting the test points 4 and 5 the A/D value is shown on the display.

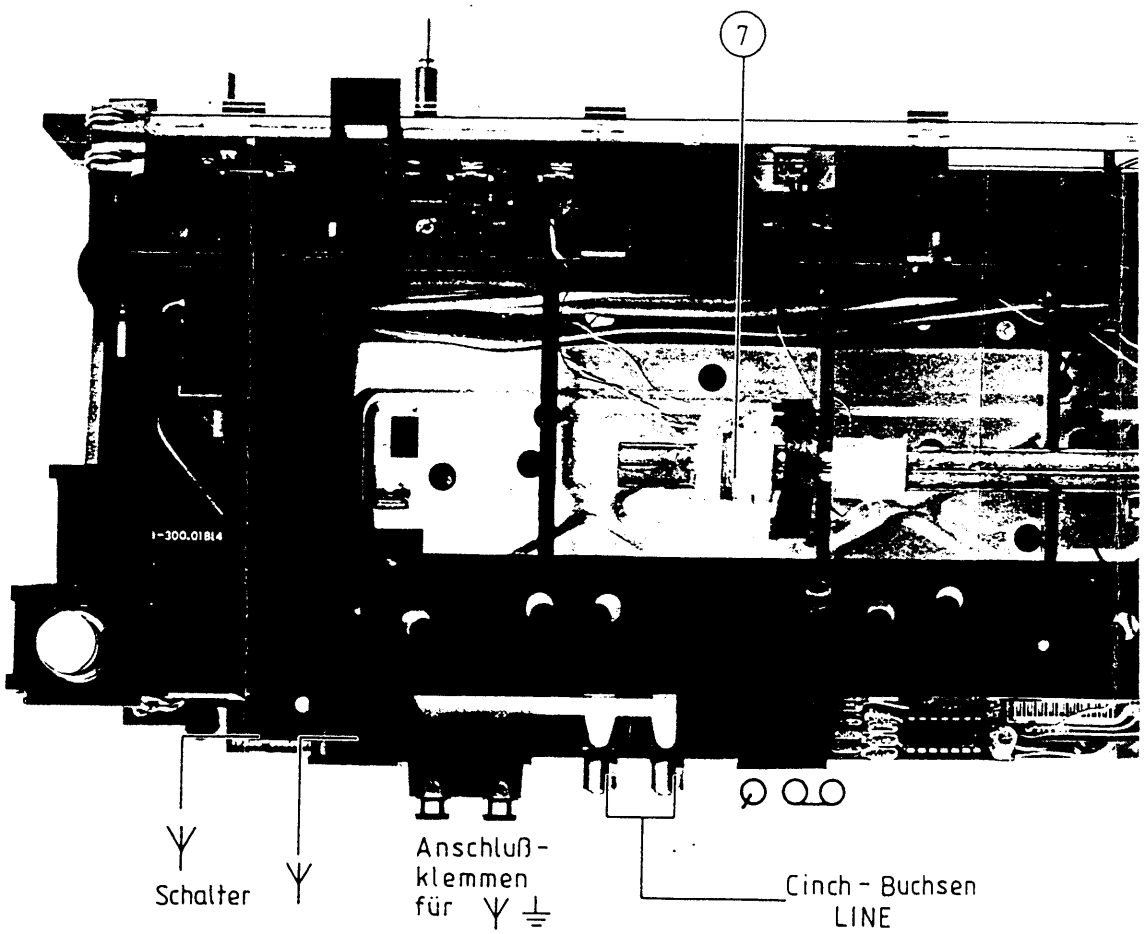
** Bei ungerasteten Meßsender kann ein bekannter Ortssender verwendet werden. Gerät mit Handabstimmung um 1kHz verstimmen.

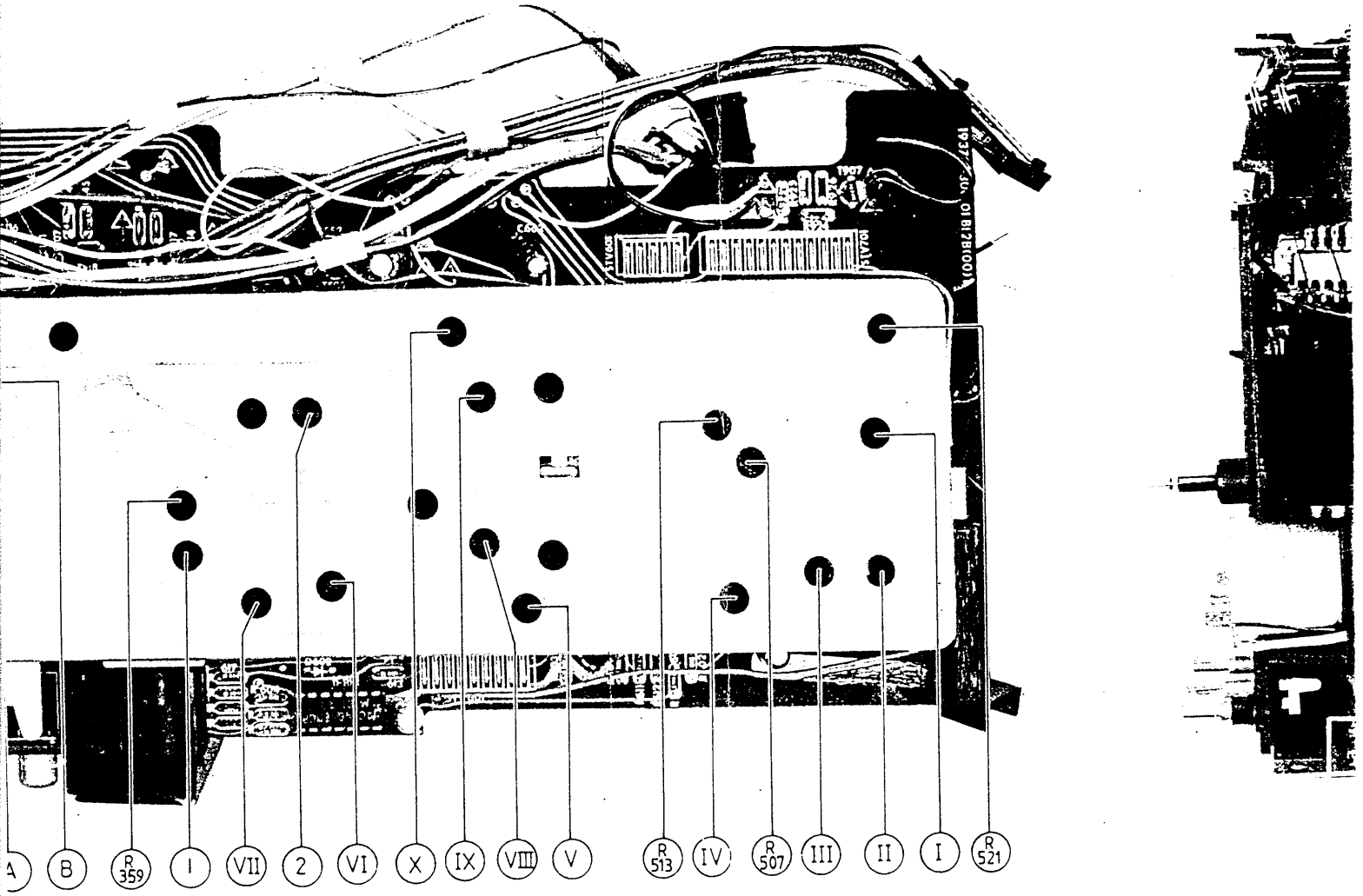
** Instead of a drifting analog test signal generator (no synthesizer) a known local station can be used. Detune the receiver manually by 1 kHz.

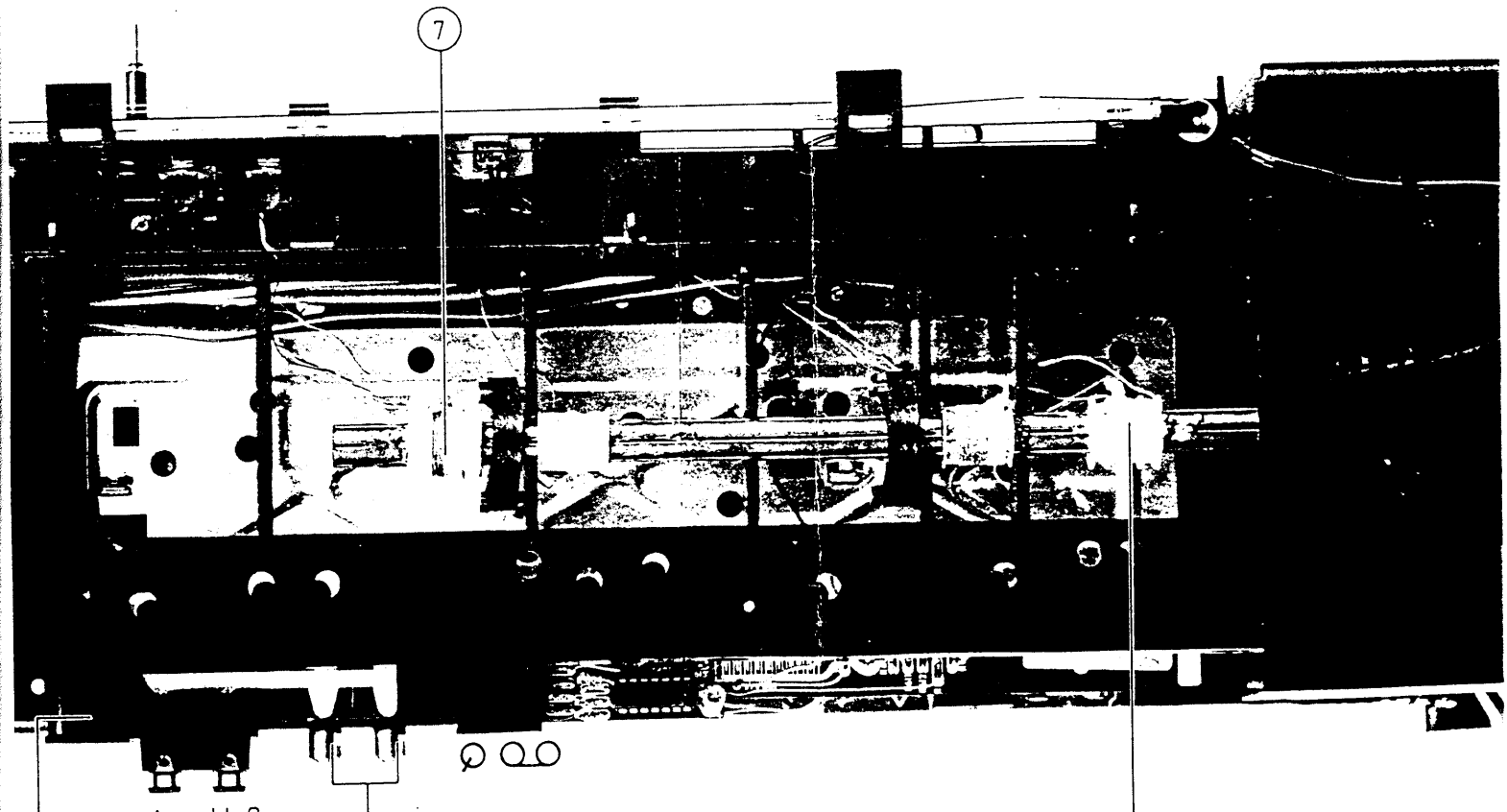


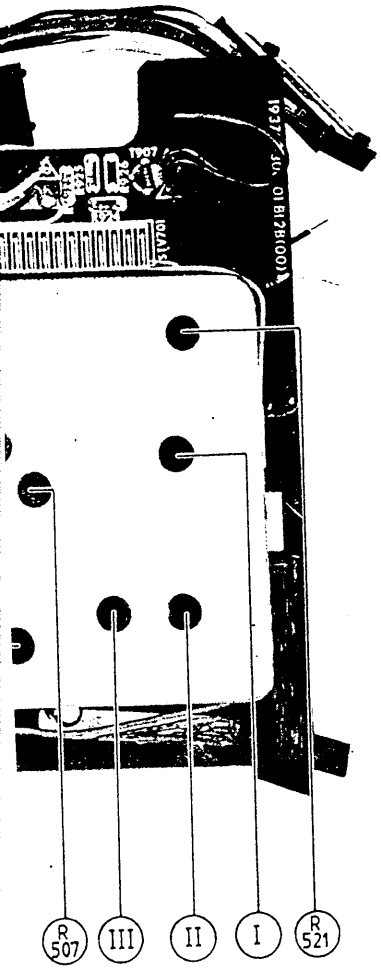
ABGLEICH-LAGEPLAN
ALIGNMENT SCHEME

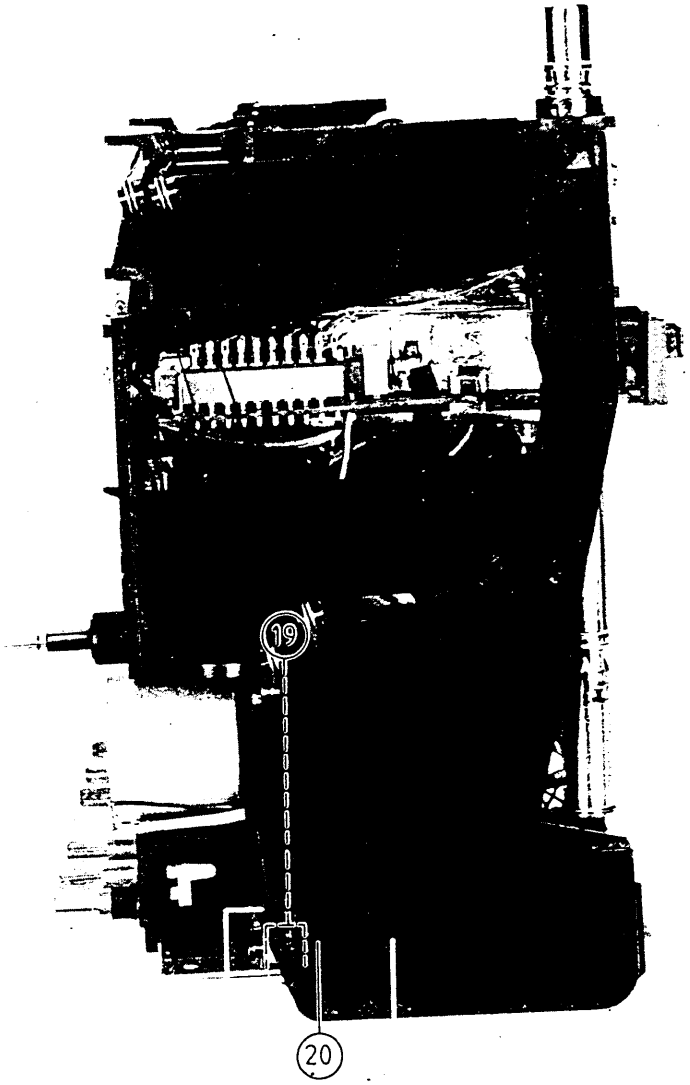
Variometerplatte Seite 4
Variometer Board page 4

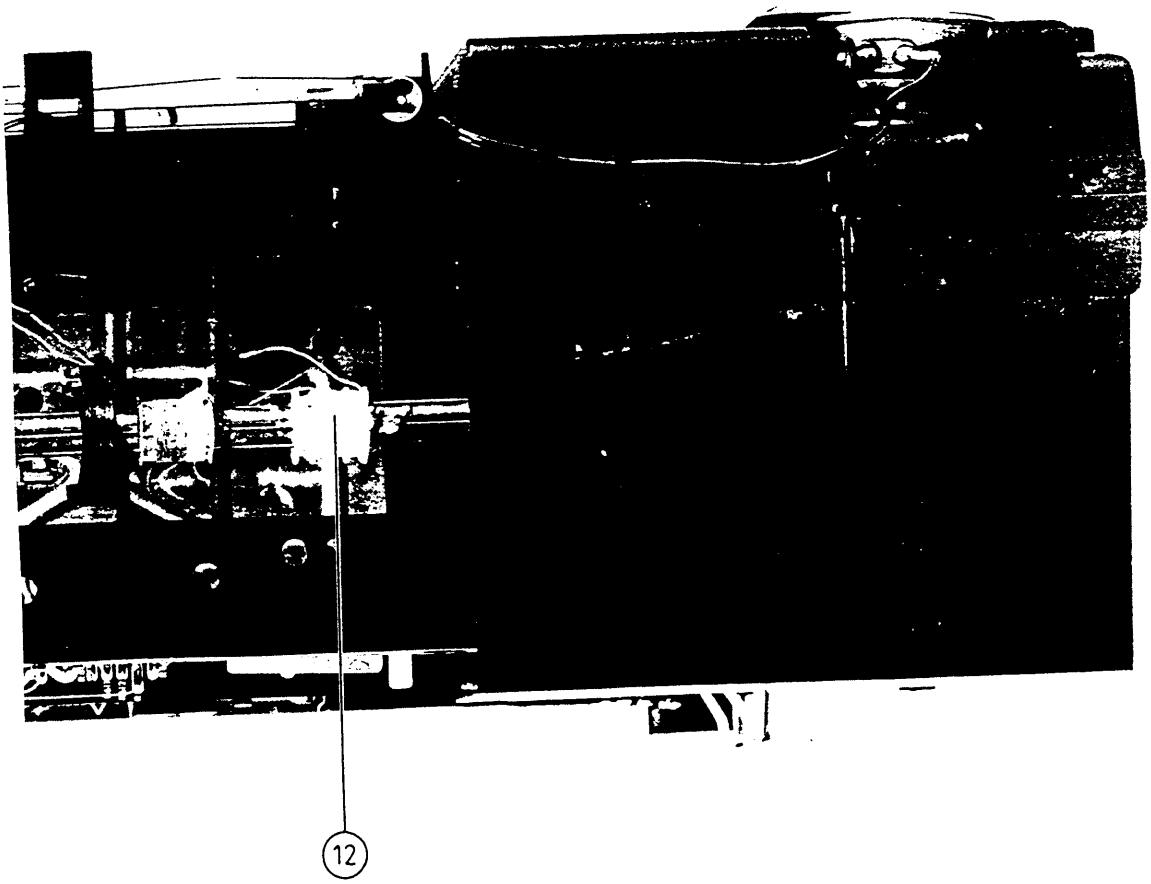


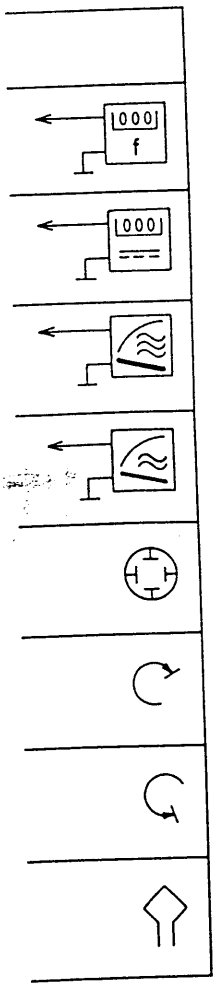

A
B
R 359
I
VII
2
VI
X
IX
VIII
V
R 513
IV
R 507
III
II
I
R 521


7
Anschluß-
klemmen
für
Cinch - Buchsen
LINE
12









ell Voltol 22 5-10 percent

ncluding toothed rack of

wheel, switch bearing,

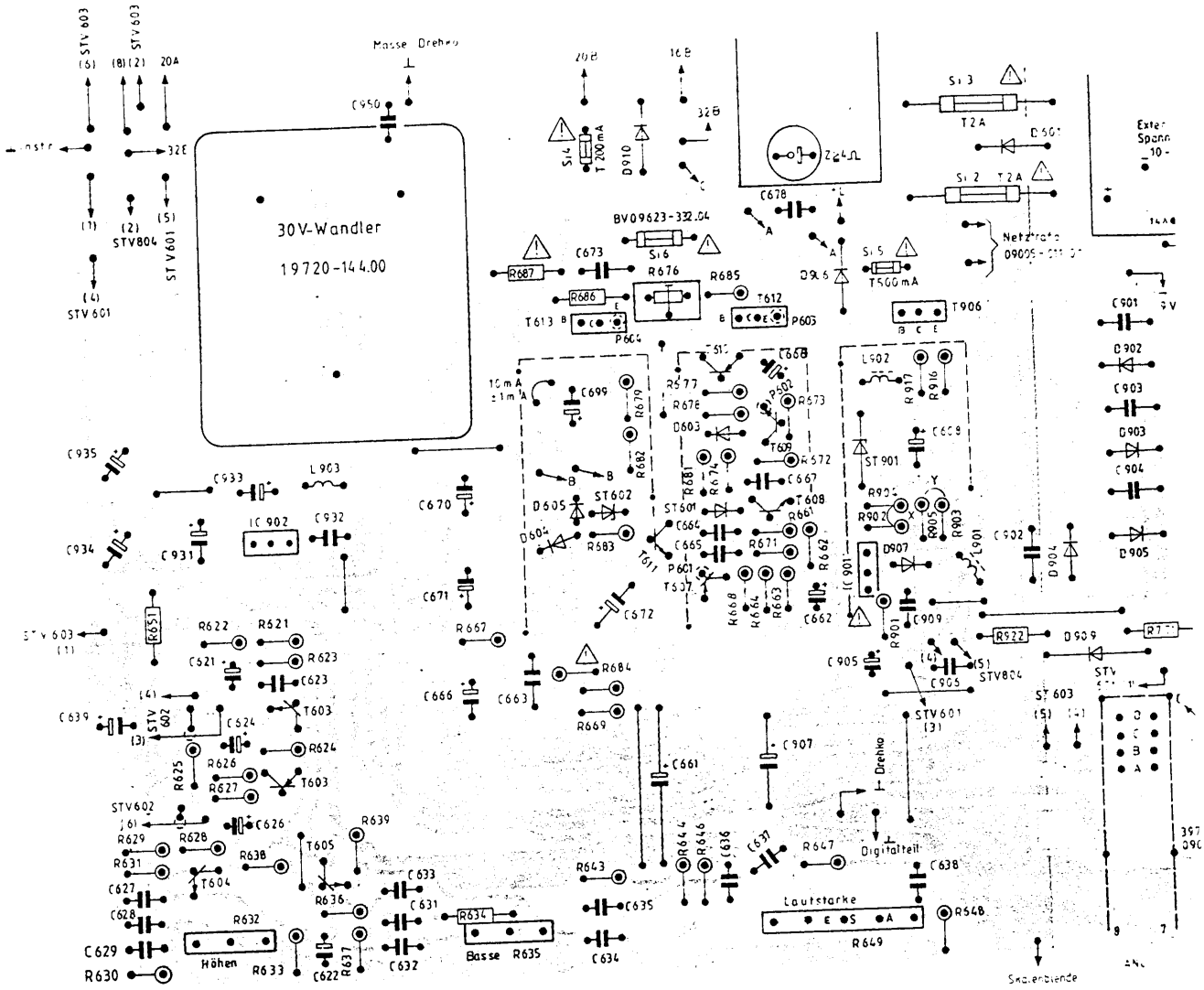
et of lubricants (Part No.

board the

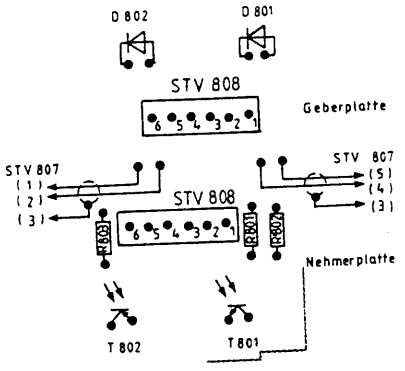
68 Hz ± 0.1 Hz

01. For this purpose,
tic capacitor in paral-
nal. The charging vol-
f necessary, connect

NF-PLATTE
AF BOARD



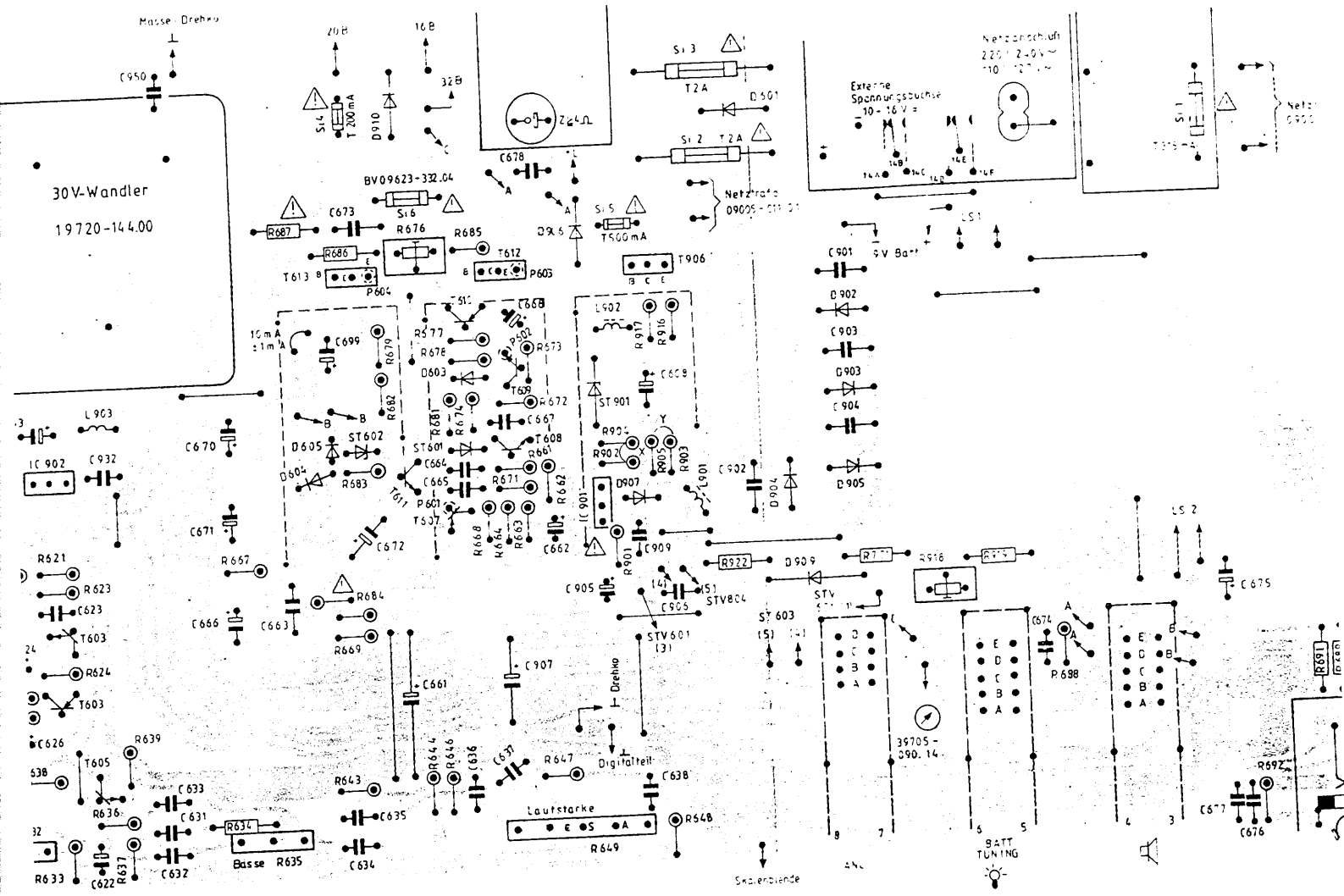
VARIO
VARIO



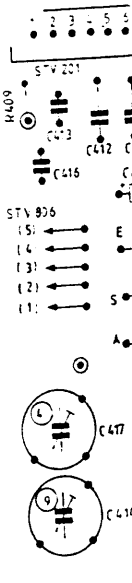
GEBERPLATTE
TRANSMITTER BOARD

NEHMERPLATTE
RECEIVER BOARD

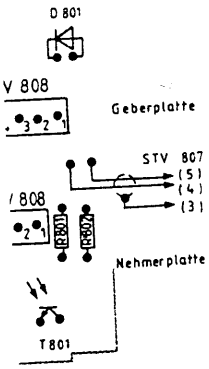
For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com



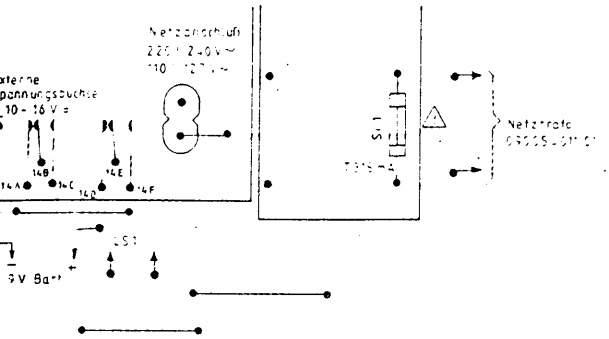
VARIOMETER-PLATTE
VARIOMETER BOARD

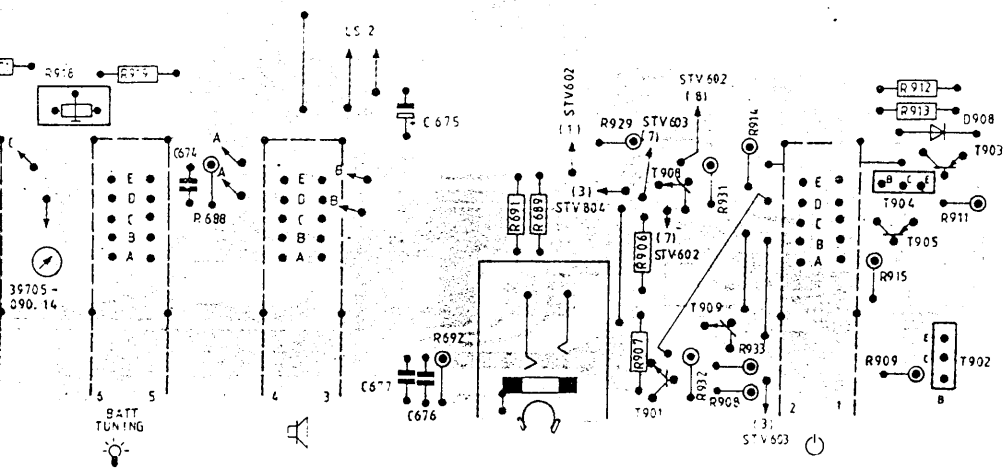


GEBERPLATTE
TRANSMITTER BOARD

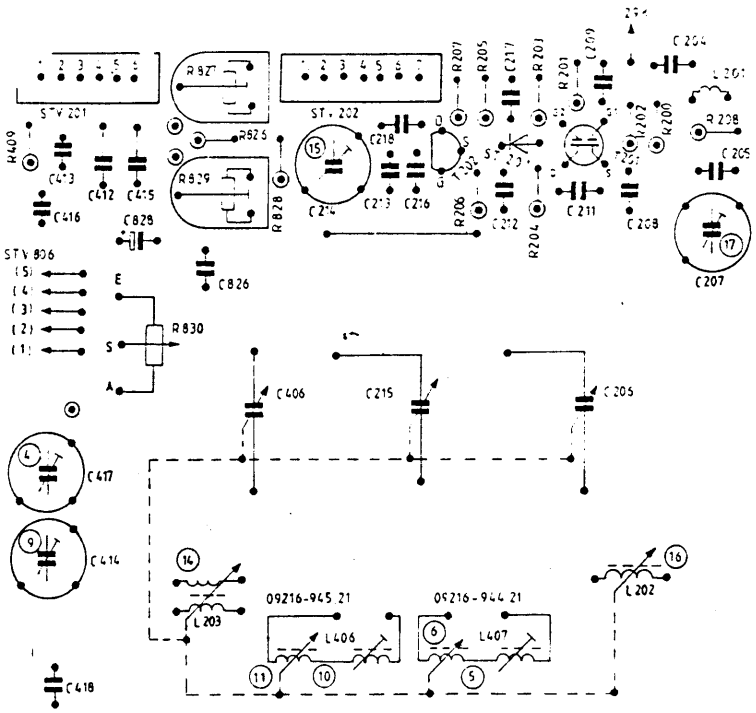


NEHMERPLATTE
RECEIVER BOARD

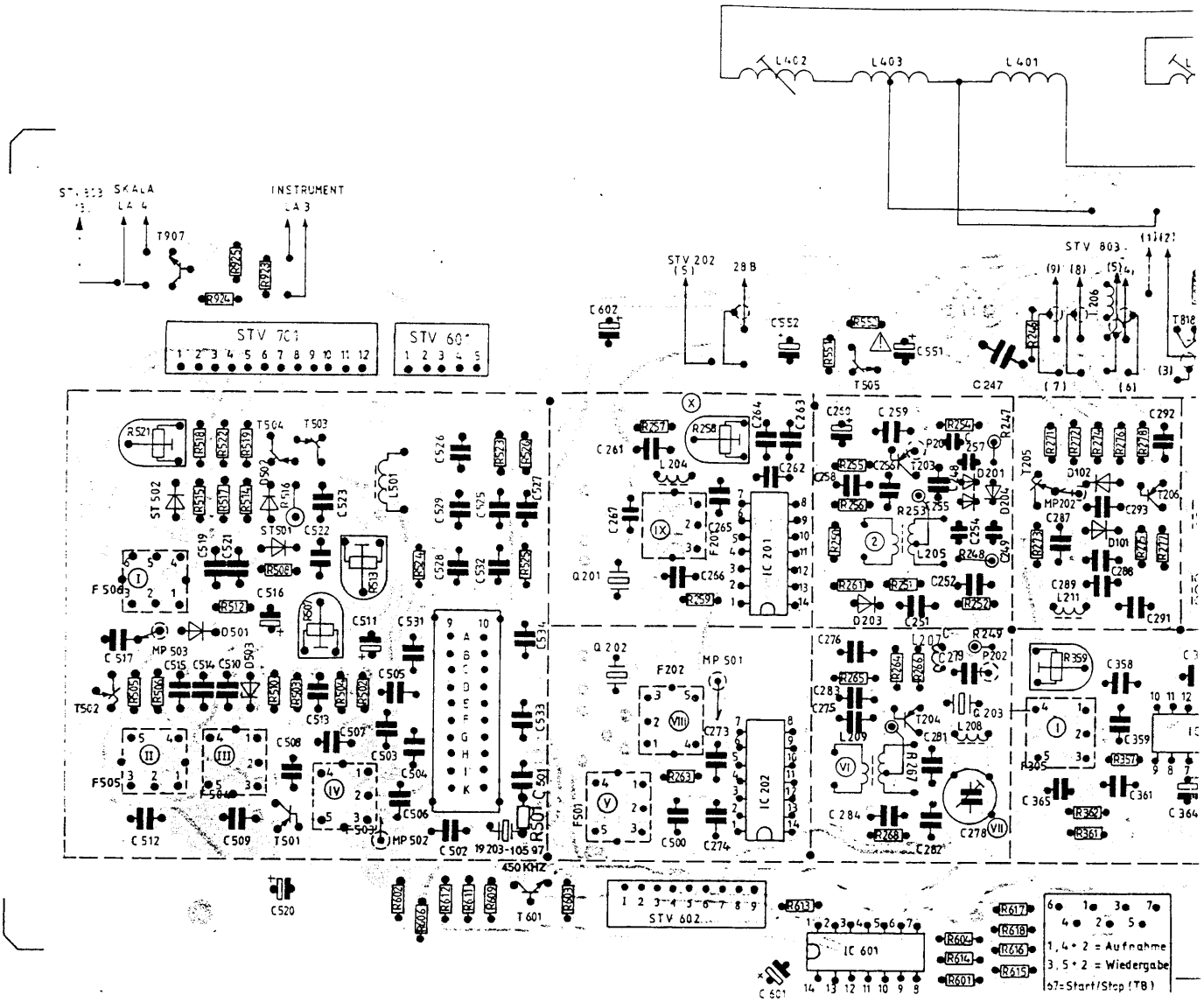


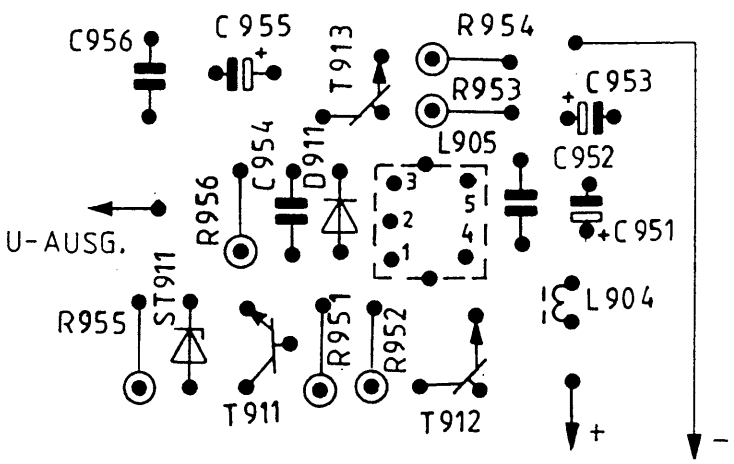


OMETER-PLATTE
OMETER BOARD



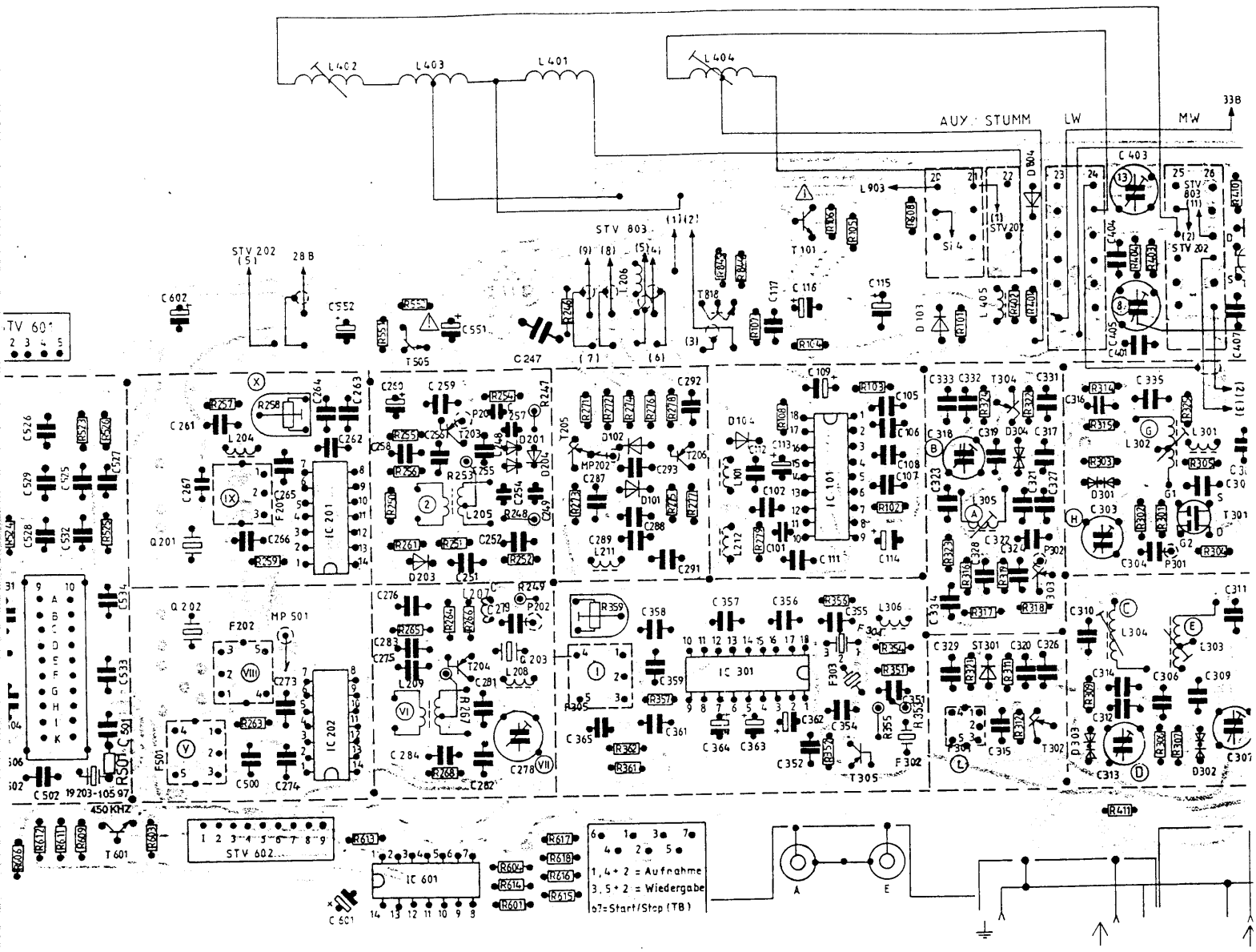
HF-ZF-Platte
RF-IF BOARD

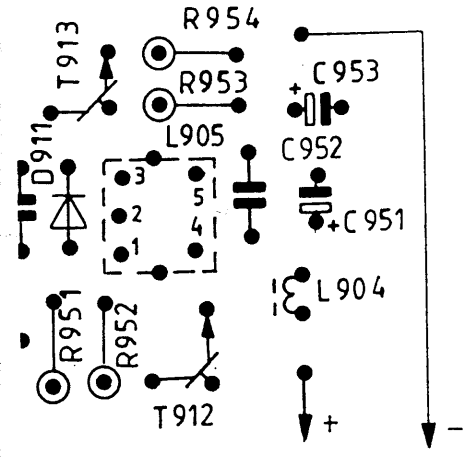




30 V WANDLER-PLATTE
30 V TRANSFOREMER BOARD

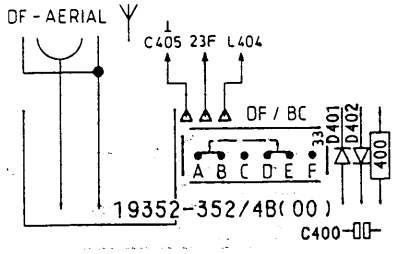
U-EING.



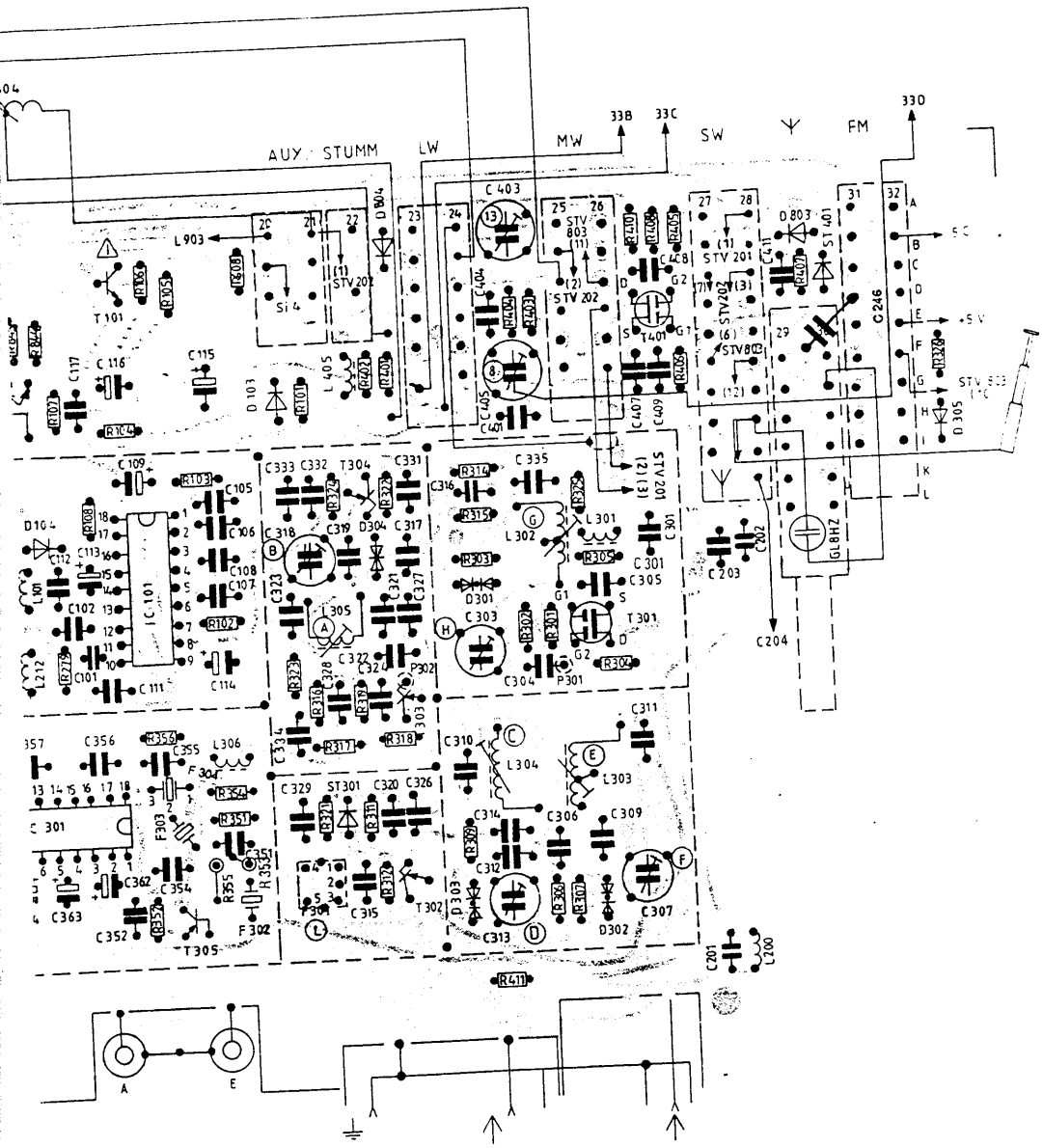


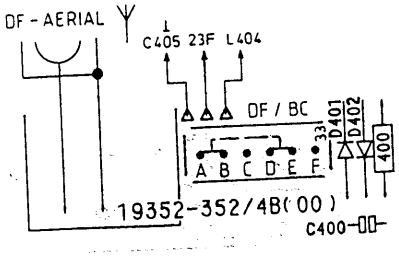
ATTE
ER BOARD

U-EING.



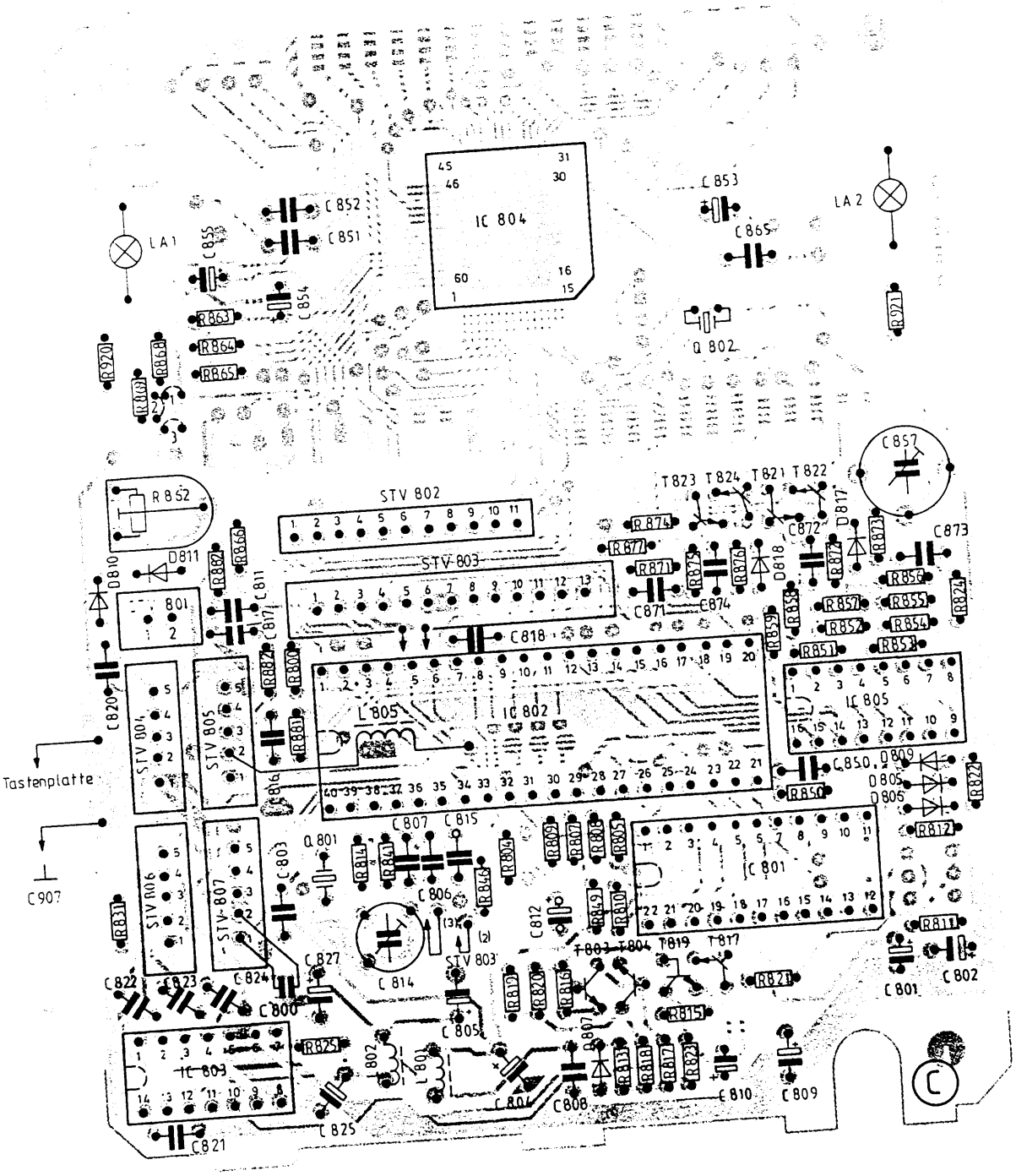
PEIL
DF-A





PEILANTENNENPLATTE
DF-AERIAL BOARD

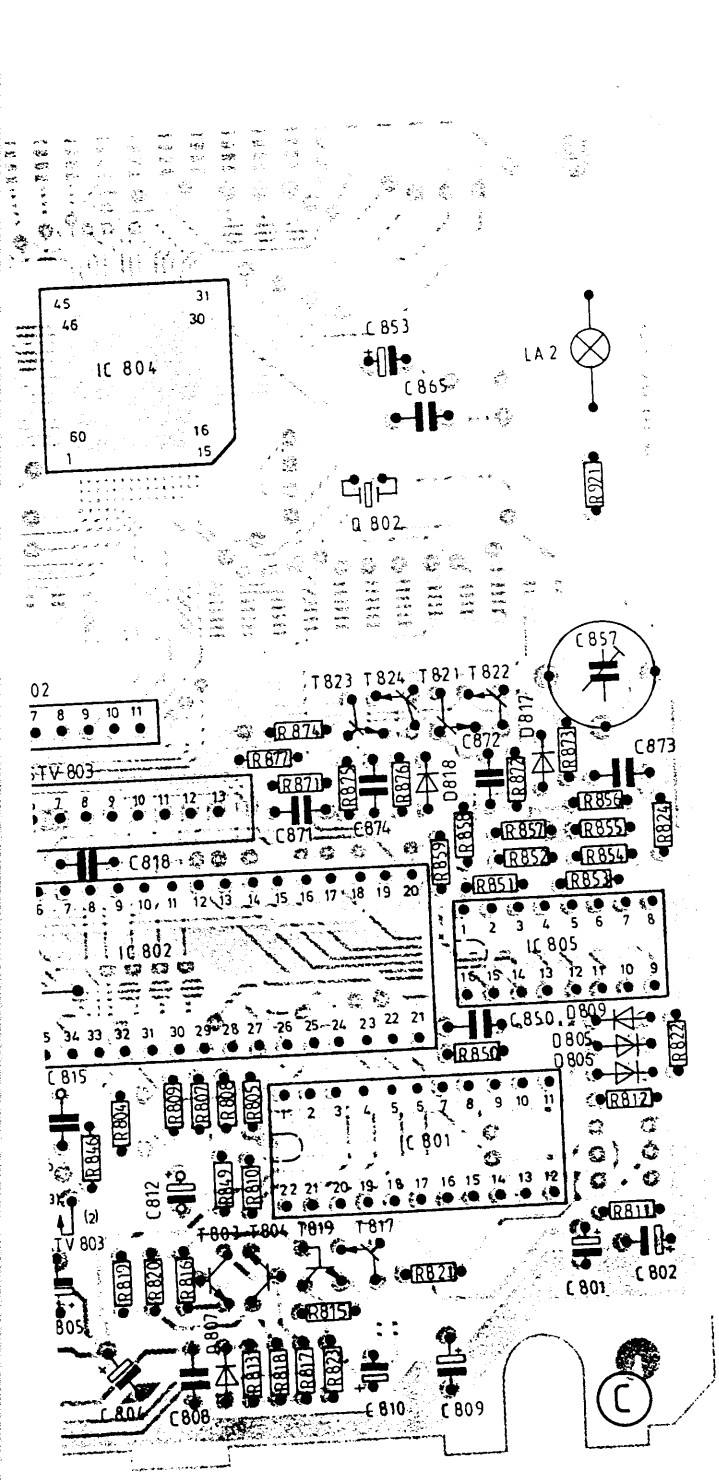
DIGITAL-PLATTE
DIGITAL BOARD

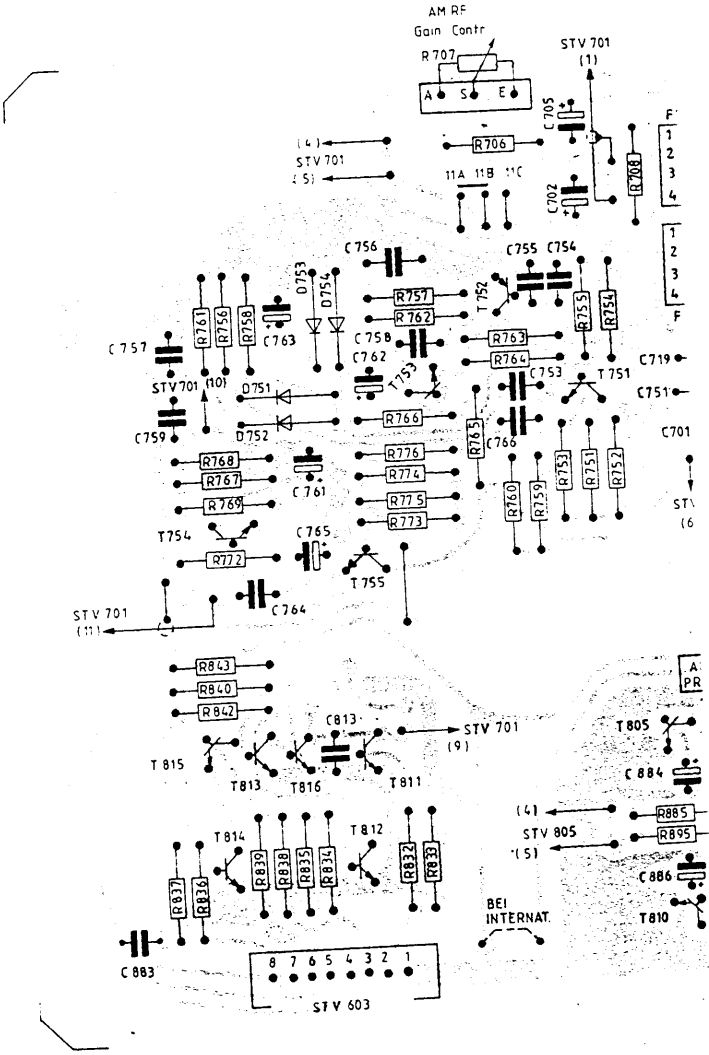


BESTÜCKUNGSSEITE
COMPONENT SIDE

LÖTSEITE
SOLDER SIDE

SSB-PLATTE
SSB BOARD

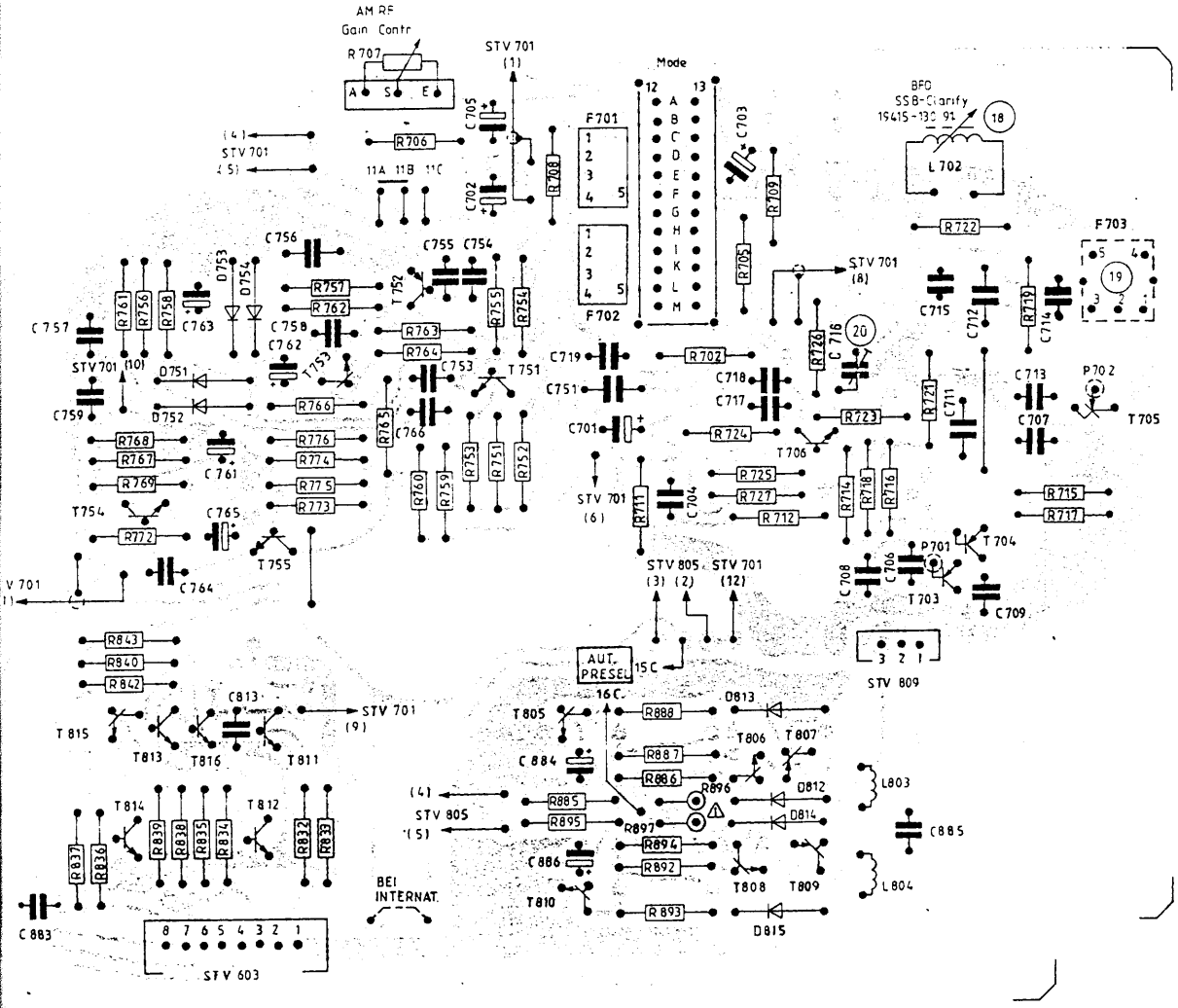


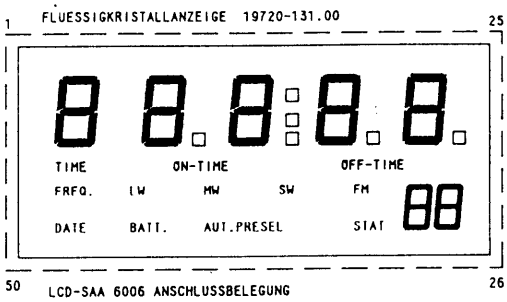


'E

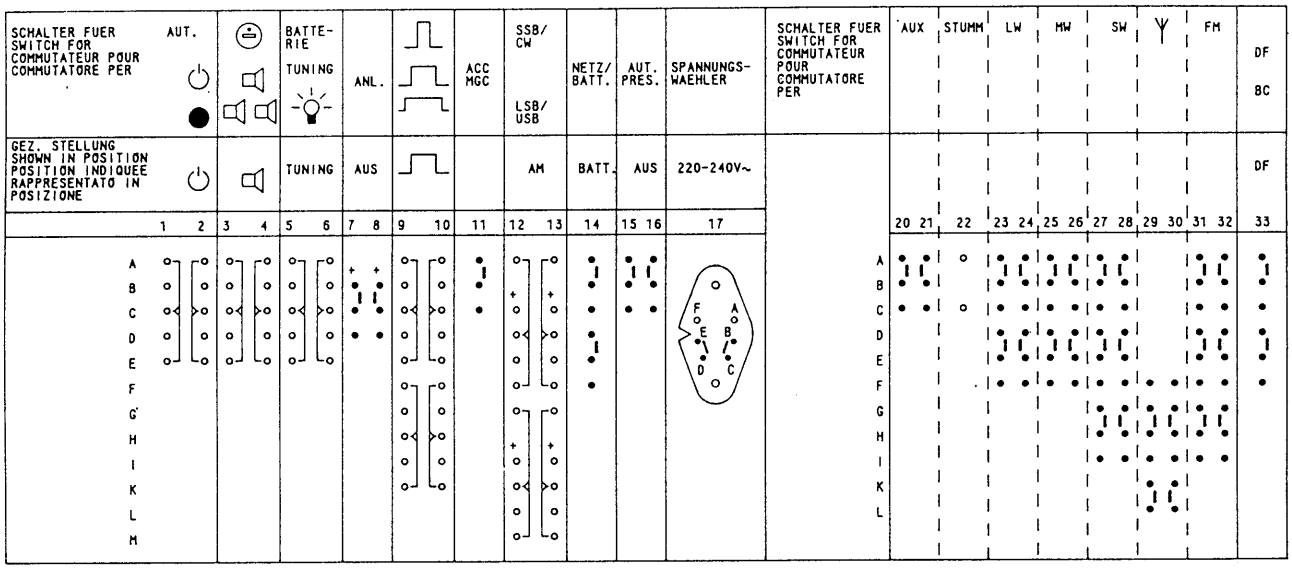
LÖTSEITE
SOLDER SIDE

PLATTE
BOARD





LCD-PIN-NR. IC804-PIN-NR. IC804-PIN-BEZ.	1/25 53 H2	2 51 048	3 50 038	4 49 028	5/14 48 018	6 47 047	7 46 037	8 45 027	9 44 017	10 43 046	11 42 036	12 41 026	13 40 016	15 39 045	16 37 035	17 36 025	18 35 015	19 34 044
LCD-PIN-NR. IC804-PIN-NR. IC804-PIN-BEZ.	20 33 034	21 32 024	22 31 014	23 29 033	24 25 032	27 24 022	28 23 012	29 26 042	30 28 023	31 27 013	32 30 043	33 22 041	35 21 031	36 20 021	45 19 011	47 18 0S1	49 17 0S2	50/26 54 H1



SCHALTRICHTUNG FUER AUX, LW, MW, SW, FM
SWITCHING DIRECTION FOR AUX, LW, MW, SW, FM
DIRECTION DE COMMUTATION POUR AUX, LW, MW, SW, FM
DIREZIONE DI COMMUTAZIONE PER AUX, LW, MW, SW, FM

FUER
FOR
POUR
PER

GEZ. STELLUNG: TASTEN IN RUHESTELLUNG
SHOWN IN POSITION: BUTTONS IN REST POSITION
POSITION INDIQUEE: TOUCHES EN POSITION REPOS
RAPPRESENTATO IN POSIZIONE: TASTI IN POSIZIONE DI RIPOSO

STECKVERBINDUNG STV	VON	NACH
201 (1-6) 202 (1-7)	HF-ZF-PLATTE	AM-VARIOMETER
601 (1-5) 602 (1-9) 603 (1-8)	NF-PLATTE	HF-ZF-PLATTE SSB-PLATTE
701 (1-12)	SSB-PLATTE	HF-ZF-PLATTE
801 (1-2) 802 (1-11) 803 (1-13) 804 (1-5) ROT 805 (1-5) GRUEN 806 (1-5) SCHWARZ	3V-BATTERIE KONTAKTFELD HF-ZF-PLATTE NF-PLATTE SSB-PLATTE AM-VARIOMETER	DIGITALTEIL
807 (1-5) BLAU 808 (1-6)	GEBERPLATTE	NEHMERPLATTE
809 (1-3)	MOTOR	SSB-PLATTE

SW-SCHWARZ BLACK NOIR NERO	BN-BRAUN BROWN BRUN MARRONE	RT-ROT RED ROUGE ROSSO
GE-GELB YELLOW JAUNE GIALLO	GN-GRUEN GREEN VERT VERDE	BL-BLAU BLUE BLEU BLU
VI-VIOLETT VIOLET VIOLET VIOLETTO	GR-GRAU GREY GRIS GRIGIO	WS-WEISS WHITE BLANC BIANCO
RS-ROSA PINK ROSE ROSA	OR-ORANGE ORANGE ARANCIONE	TR-TRANSPARENT TRANSPARENT TRANSPARENT TRASPARENTE

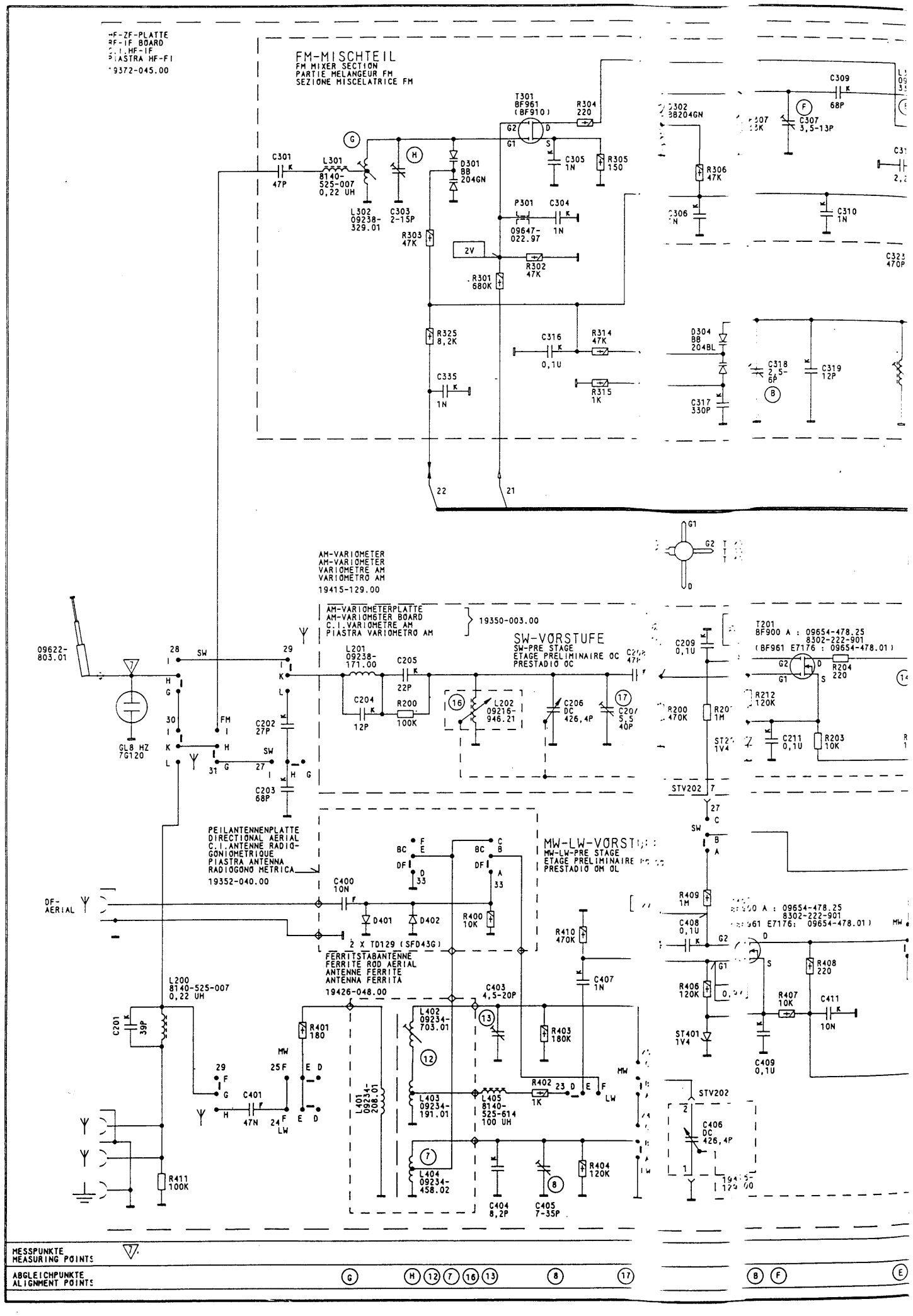
GLEICHSPANNUNG
DC-VOLTAGE
TENSION CONTINUE
TENSION CONTINUA

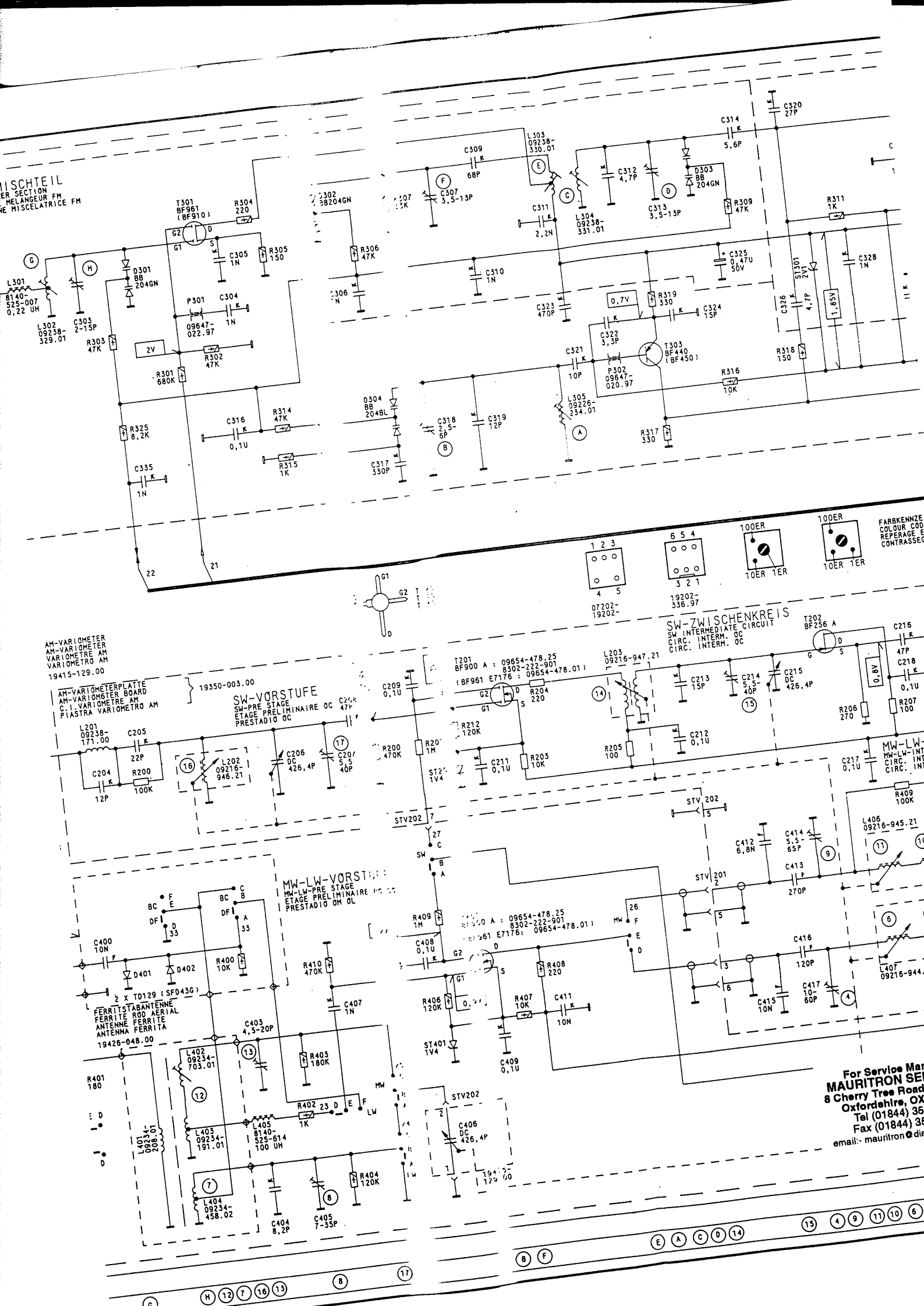
WECHSELSPANNUNG
AC-VOLTAGE
TENSION ALTERNATIVE
TENSIONE ALTERNATA

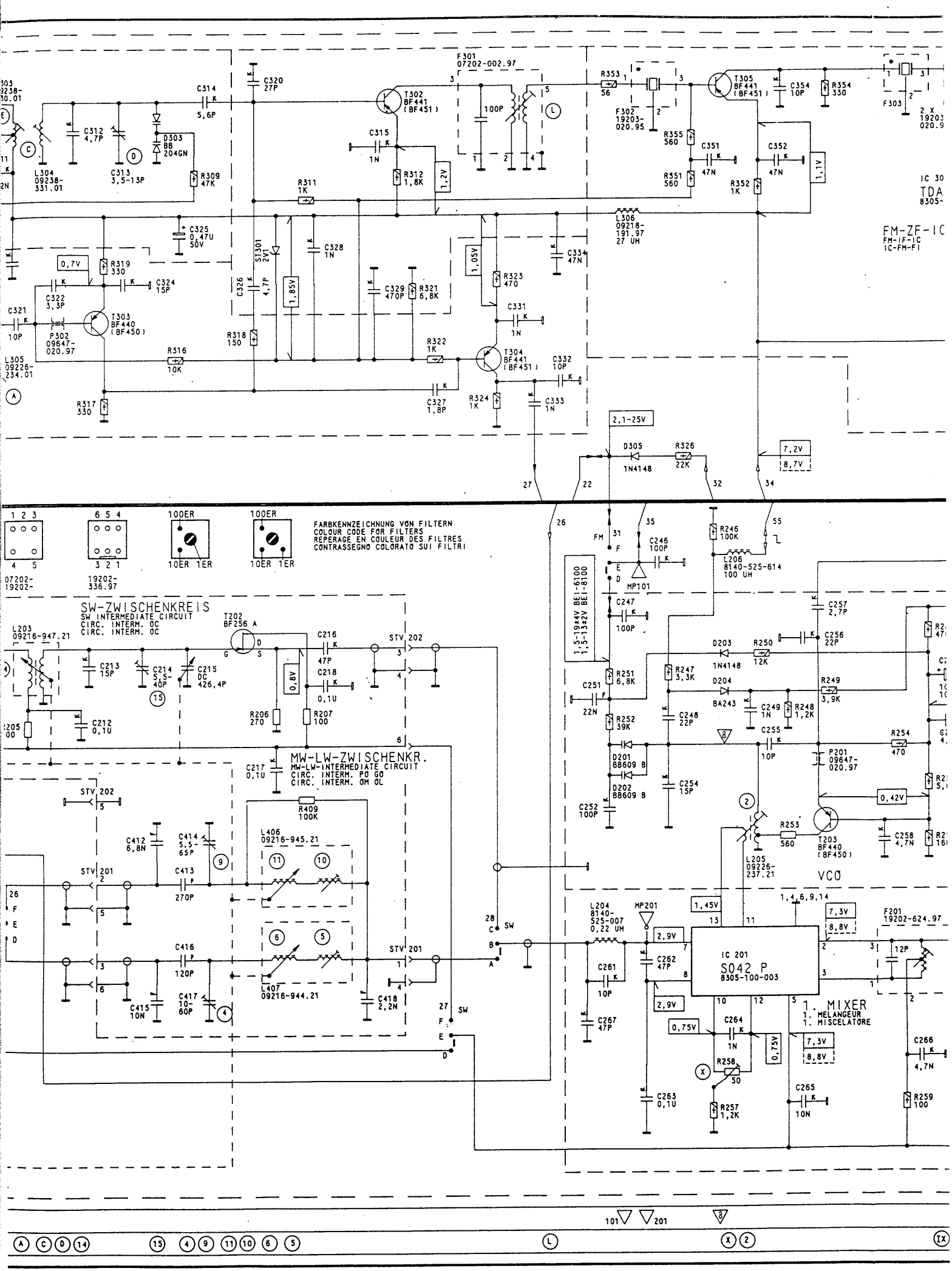
REGELSPANNUNG
CONTROL VOLTAGE
TENSION DE REGLAGE
TENSIONE DI CONTROLLO

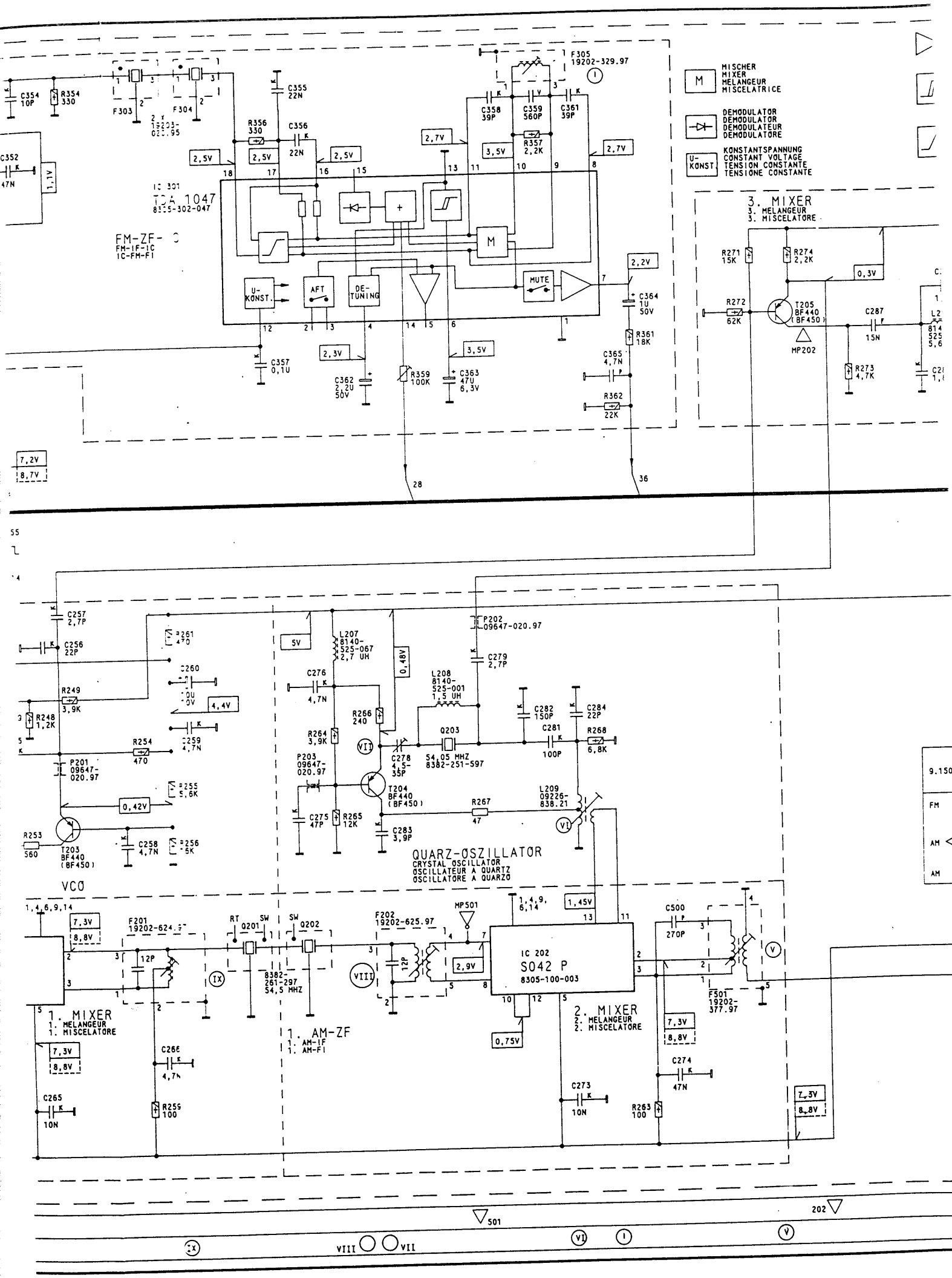
ABSTIMMSPANNUNG
TUNING VOLTAGE
TENSION DE SYNTONISATION
TENSIONE DI SINTONIA

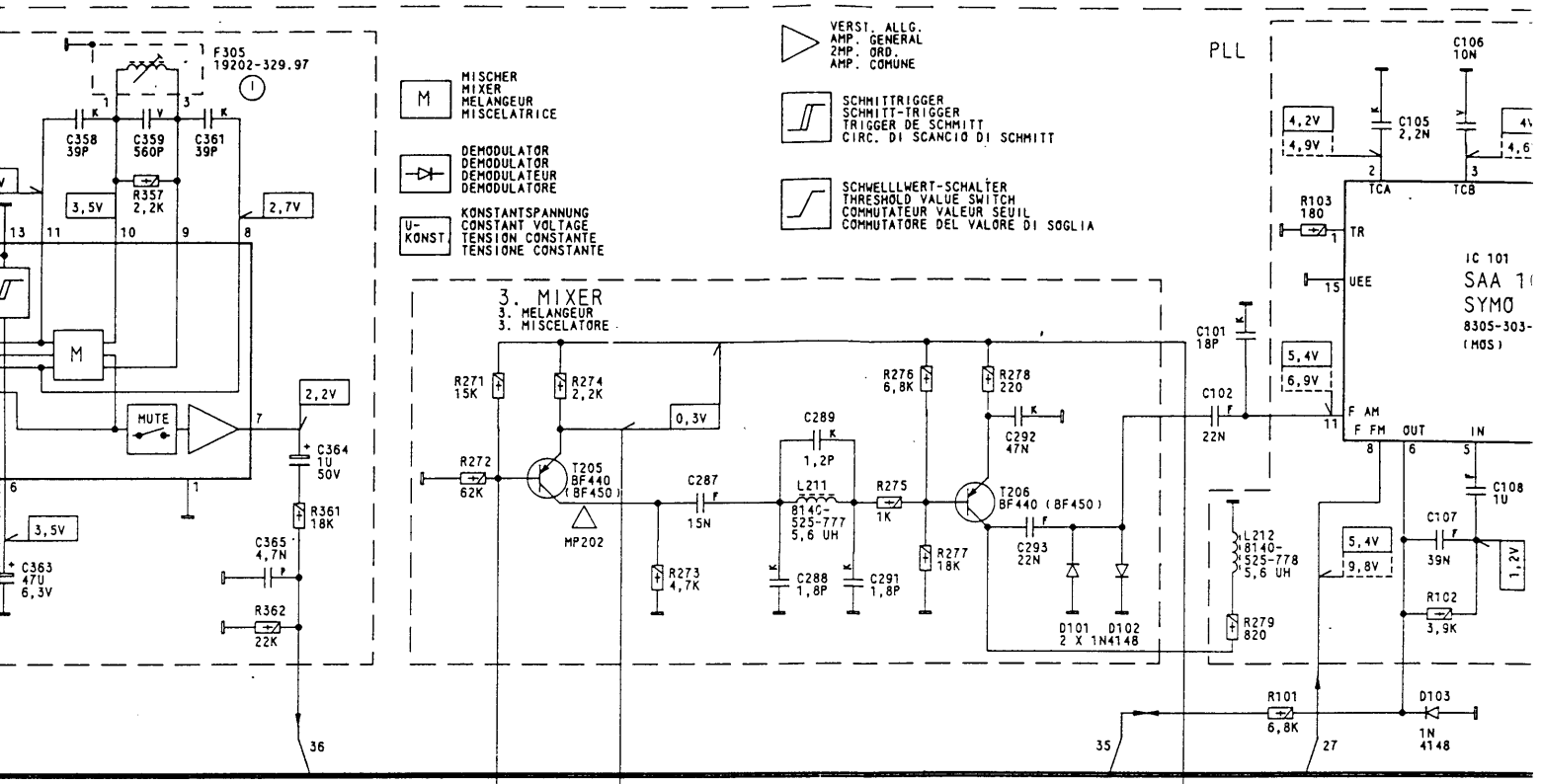
SCHALTSPANNUNG
SWITCHING VOLTAGE
TENSION DE COMMUTATION
TENSIONE DI COMMUTAZIONE


HF-ZF-PLATTE
RF-IF BOARD
C.I. HF-IF
PIASTRA HF-FI
19372-045.00
FM-MISCHTEIL
FM MIXER SECTION
PARTIE MELANGEUR FM
SEZIONE MISCELATRICE FM
T301
BF961
(BF910)
R304
220
G2
D
G1
S
C301
47P
L301
8140-
525-007
0,22 UH
L302
09238-
329.01
C303
2-15P
D301
BB
204GN
C305
1N
R305
150
P301
09647-
022.97
C304
1N
R303
47K
2V
R302
47K
R301
680K
R325
8,2K
C335
1N
C316
0,1U
R314
47K
R315
1K
D304
BB
204BL
C317
330P
C318
2,5-
6P
C319
12P
C309
68P
C307
3,5-13P
C310
1N
R306
47K
C323
470P
22
21
AM-VARIOMETER
AM-VARIOMETER
VARIOMETRE AM
VARIOMETRO AM
19415-129.00
AM-VARIOMETERPLATTE
AM-VARIOMETER BOARD
C.I. VARIOMETRE AM
PIASTRA VARIOMETRO AM
19350-003.00
SW-VORSTUFE
SW-PRE STAGE
ETAGE PRELIMINAIRE OC
PRESTADIO OC
09622-
803.01
GL8 HZ
7G120
28
SW
29
30
FM
31
27
L201
09238-
171.00
C205
22P
C204
12P
R200
100K
L202
09216-
946.21
C206
DC
426,4P
C202
27P
C203
68P
PEILANTENNENPLATTE
DIRECTIONAL AERIAL
C.I. ANTENNE RADIO-
GONIOMETRIQUE
PIASTRA ANTENNA
RADIOGONO METRICA
19352-040.00
DF-
AERIAL
C400
10N
D401
D402
2 X TD129 (SFD43G)
R400
10K
FERRITSTABANTENNE
FERRITE ROD AERIAL
ANTENNE FERRITE
ANTENNA FERRITA
19426-048.00
MW-LW-VORSTUFE
MW-LW-PRE STAGE
ETAGE PRELIMINAIRE PO
PRESTADIO OM OL
L200
8140-525-007
0,22 UH
C201
39P
R401
180
L401
09234-
208.01
C401
47N
L402
09234-
703.01
L403
09234-
191.01
L404
09234-
458.02
C403
4,5-20P
R403
180K
R402
1K
L405
8140-
525-614
100 UH
C404
8,2P
C405
7-35P
R404
120K
R411
100K
R410
470K
C407
1N
T201
BF900 A : 09654-478.25
8302-222-901
(BF961 E7176 : 09654-478.01)
C209
0,1U
R204
220
R212
120K
C211
0,1U
R203
10K
R200
470K
R201
1M
ST201
1V4
STV202
R409
1M
C408
0,1U
R406
120K
R407
10K
C411
10N
R408
220
C409
0,1U
ST401
1V4
C406
DC
426,4P
MESSPUNKTE
MEASURING POINTS
ABGLEICHPUNKTE
ALIGNMENT POINTS

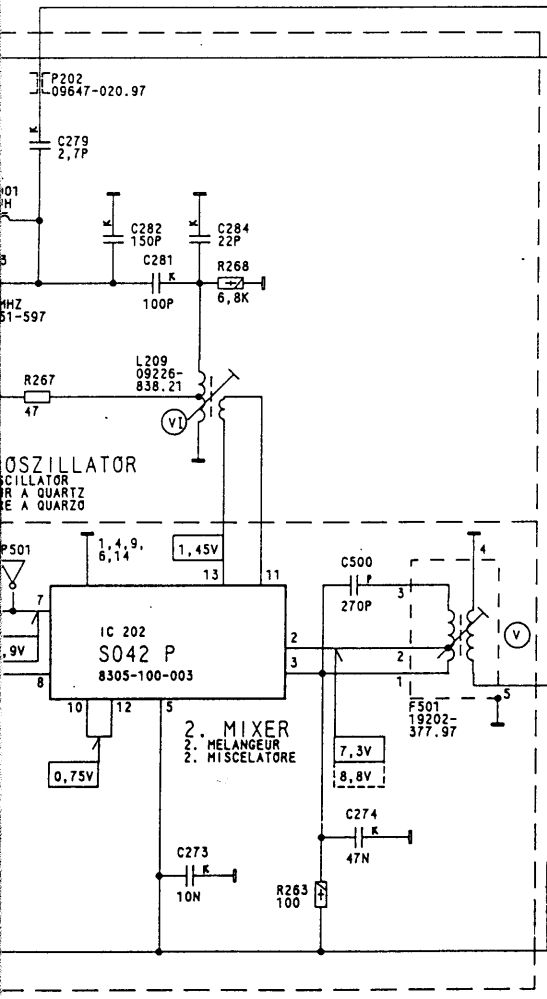

SW-ZWISCHENKREIS
SW INTERMEDIATE CIRCUIT
CIRC. INTERM. OC
SW-VORSTUFE
SW-PRE STAGE
ETAGE PRELIMINAIRE OC
PRESTADIO OC
MW-LW-VORSTUFE
MW-LW-PRE STAGE
ETAGE PRELIMINAIRE
PRESTADIO OM OL
AM-VARIOMETER
AM-VARIOMETER
VARIOMETRE AM
VARIOMETRO AM
19415-129.00
AM-VARIOMETERPLATTE
AM-VARIOMETER BOARD
C.I. VARIOMETRE AM
PIASTRA VARIOMETRO AM
19350-003.00
FERRITSTABANTENNE
FERRITE ROD AERIAL
ANTENNE FERRITE
ANTENNA FERRITA
19426-048.00
2 X T0129 (SFD43G)
T301 BF961 (BF910)
T303 BF440 (BF450)
T202 BF256 A
T201 BF900 A : 09654-478.25
8302-222-901
(BF961 E7176 : 09654-478.01)
D301 BB 204GN
D303 BB 204GN
D304 BB 204BL
D302 BB204GN
L301 8140-525-007 0,22 UH
L302 09238-329.01
L303 09238-330.01
L304 09238-331.01
L305 09226-234.01
L201 09238-171.00
L202 09216-946.21
L203 09216-947.21
L401 09234-208.01
L402 09234-703.01
L403 09234-191.01
L404 09234-458.02
L405 8140-525-614 100 UH
L406 09216-945.21
L407 09216-944.
P301 09647-022.97
P302 09647-020.97
ST301 2V1
ST401 1V4
07202-19202-
19202-336.97
100ER 10ER 1ER
FARBKENNZE
COLOUR COD
REPERAGE E
CONTRASSEG
For Service Ma
MAURITRON SE
8 Cherry Tree Road
Oxfordshire, OX
Tel (01844) 35
Fax (01844) 35
email:- mauritron@di

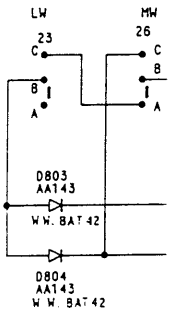

FM-ZF-IC
FM-IF-IC
IC-FM-FI
IC 30
TDA
8305-
SW-ZWISCHENKREIS
SW INTERMEDIATE CIRCUIT
CIRC. INTERM. OC
CIRC. INTERM. OC
MW-LW-ZWISCHENKR.
MW-LW-INTERMEDIATE CIRCUIT
CIRC. INTERM. PO GO
CIRC. INTERM. OM OL
FARBKENNZEICHNUNG VON FILTERN
COLOUR CODE FOR FILTERS
REPERAGE EN COULEUR DES FILTRES
CONTRASSEGNO COLORATO SUI FILTRI
VCO
1. MIXER
1. MELANGEUR
1. MISCELATORE
IC 201
SO42 P
8305-100-003


MISCHER
MIXER
MELANGEUR
MISCELATRICE
DEMODULATOR
DEMODULATOR
DEMODULATEUR
DEMODULATORE
KONSTANTSPANNUNG
CONSTANT VOLTAGE
TENSION CONSTANTE
TENSIONE CONSTANTE
F305 19202-329.97
C354 10P
R354 330
F303
F304
2 x 19203-020.95
C355 22N
R356 330
C356 22N
C358 39P
C359 560P
C361 39P
R357 2,2K
C352 47N
IC 301
TDA 1047
8325-302-047
FM-ZF-
FM-IF-IC
IC-FM-FI
U-KONST.
AFT
DE-TUNING
MUTE
C364 1U 50V
R361 18K
C365 4,7N
R362 22K
C357 0,1U
C362 2,2U 50V
R359 100K
C363 47U 6,3V
3. MIXER
3. MELANGEUR
3. MISCELATORE
R271 15K
R274 2,2K
R272 62K
T205 BF440 (BF450)
MP202
C287 15N
R273 4,7K
C257 2,7P
C256 22P
R261 470
C260 10U 10V
R249 3,9K
R248 1,2K
C259 4,7N
R254 470
P201 09647-020.97
R255 5,6K
R253 560
T203 BF440 (BF450)
C258 4,7N
R256 5K
5V
L207 8140-525-067 2,7 UH
C276 4,7N
R266 240
R264 3,9K
P203 09647-020.97
C275 47P
R265 12K
C278 4,5-35P
T204 BF440 (BF450)
C283 3,9P
P202 09647-020.97
C279 2,7P
L208 8140-525-001 1,5 UH
Q203 54,05 MHZ 8382-251-597
C282 150P
C284 22P
C281 100P
R268 6,8K
R267 47
L209 09226-838.21
QUARZ-OSZILLATOR
CRYSTAL OSCILLATOR
OSCILLATEUR A QUARTZ
OSCILLATORE A QUARZO
VCO
F201 19202-624.97
RT Q201 SW
SW Q202
12P
8382-261-297 54,5 MHZ
F202 19202-625.97
MP501
IC 202 S042 P 8305-100-003
C500 270P
F501 19202-377.97
1. MIXER
1. MELANGEUR
1. MISCELATORE
C266 4,7N
R259 100
C265 10N
1. AM-ZF
1. AM-IF
1. AM-FI
2. MIXER
2. MELANGEUR
2. MISCELATORE
C274 47N
C273 10N
R263 100
7,2V
8,7V
7,3V
8,8V
4,4V
0,42V
0,48V
2,9V
0,75V
1,45V
0,3V
2,7V
3,5V
2,5V
2,3V
2,2V
1,1V
501
202
28
36



ACHTUNG!
VORSCHRIFTEN BEIM UMGANG MIT MOS-BAUTEILEN BEACHTEN!
ATTENTION!
OBSERVE MOS COMPONENTS HANDLING INSTRUCTIONS WHEN SERVICING!
ATTENTION!
LORS DE LA MANIPULATION DES CIRCUITS MOS, RESPECTER LES PESCRIPTIONS MOS!
ATTENZIONE!
OSSERVARE LE RELATIVE PRESCRIZIONI DURANTE, LAVORI CON COMPONENTI MOS!

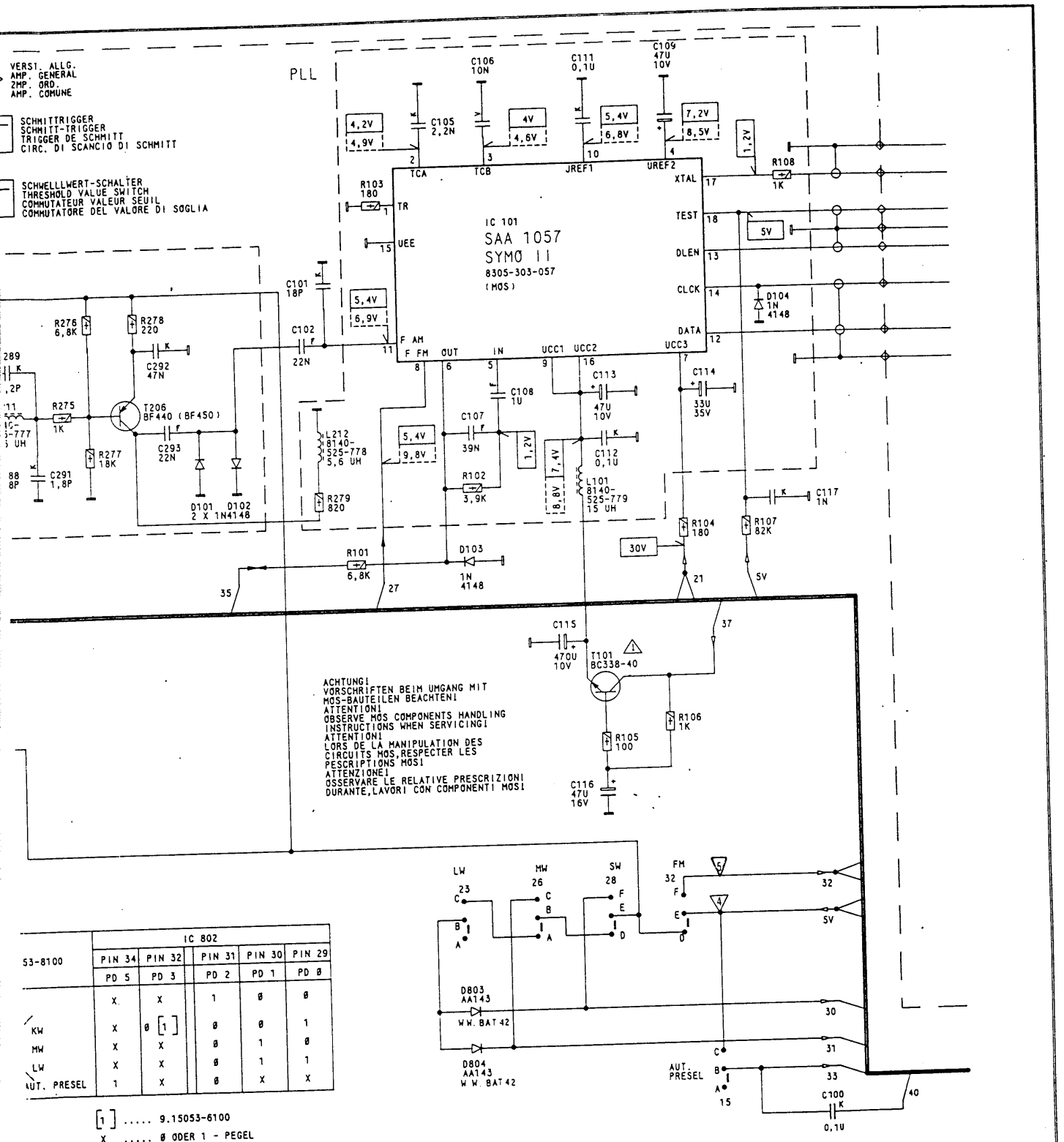




9.15053-8100		IC 802				
		PIN 34	PIN 32	PIN 31	PIN 30	PIN 29
		PD 5	PD 3	PD 2	PD 1	PD 0
FM		X	X	1	0	0
AM	KW	X	0 [1]	0	0	1
	MW	X	X	0	1	0
	LW	X	X	0	1	1
AM	AUT. PRESEL	1	X	0	X	X

[1] 9.15053-6100
X ..... 0 ODER 1 - PEGEL

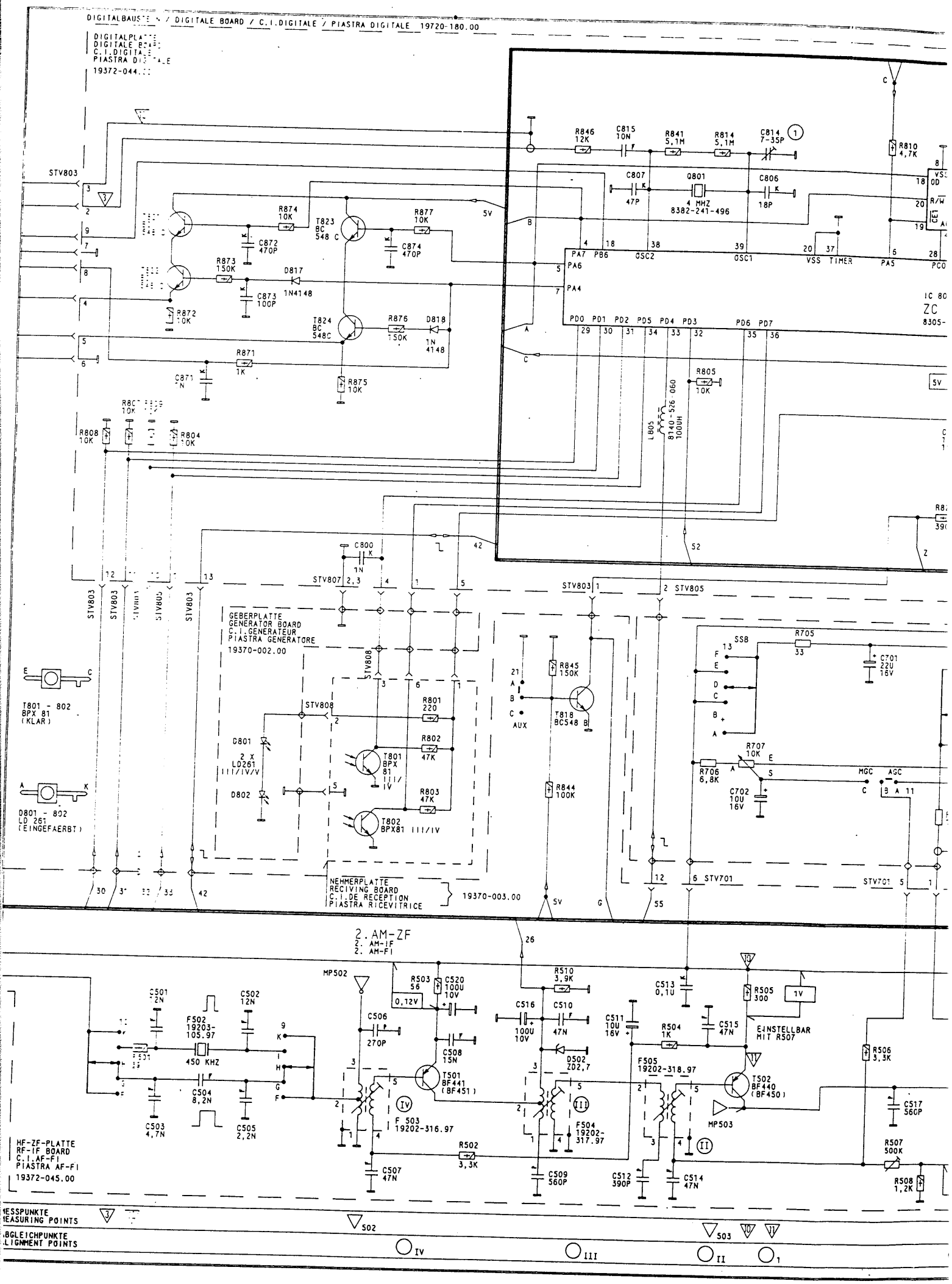
WELLENBEREICHE:	LW , GO , GL	148 - 420	KHZ	
WAVEBANDS:	MW , PO , OM	510 - 1620	KHZ	
GAMMES D'ONDES:	KW , SW , OC	1,6 - 26,1	MHZ	BEI 9.15053-8100
GAMME D'ONDA:	KW , SW , OC	1,6 - 30	MHZ	BEI 9.15053-6100
	FM	87,5- 108	MHZ	
	FM-ZF , FM-IF , MF-FI	10,7	MHZ	
	1. AM-ZF , AM-IF , AM-FI	54,5	MHZ	
	2. AM-ZF , AM-IF , AM-FI	450	KHZ	

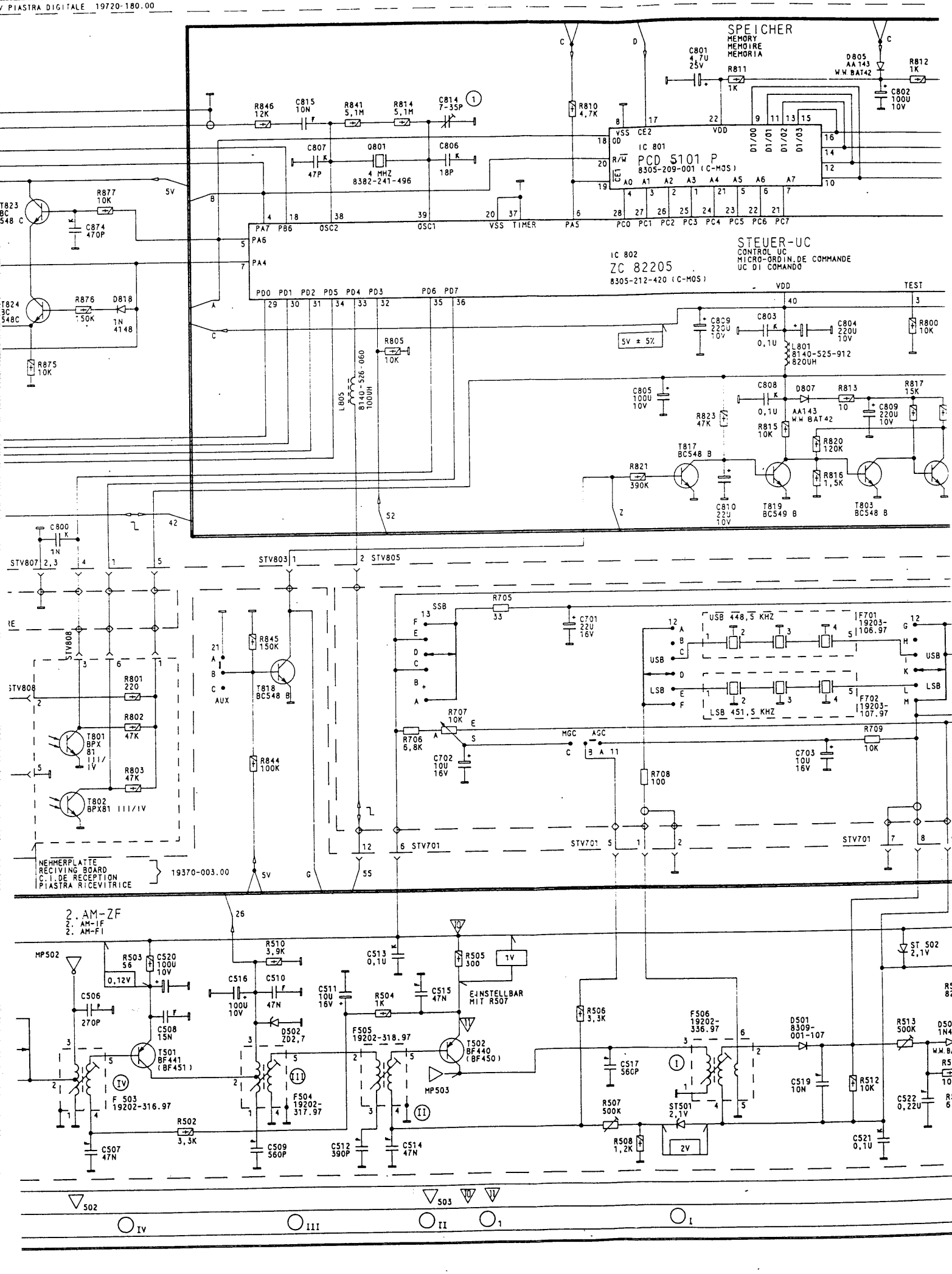


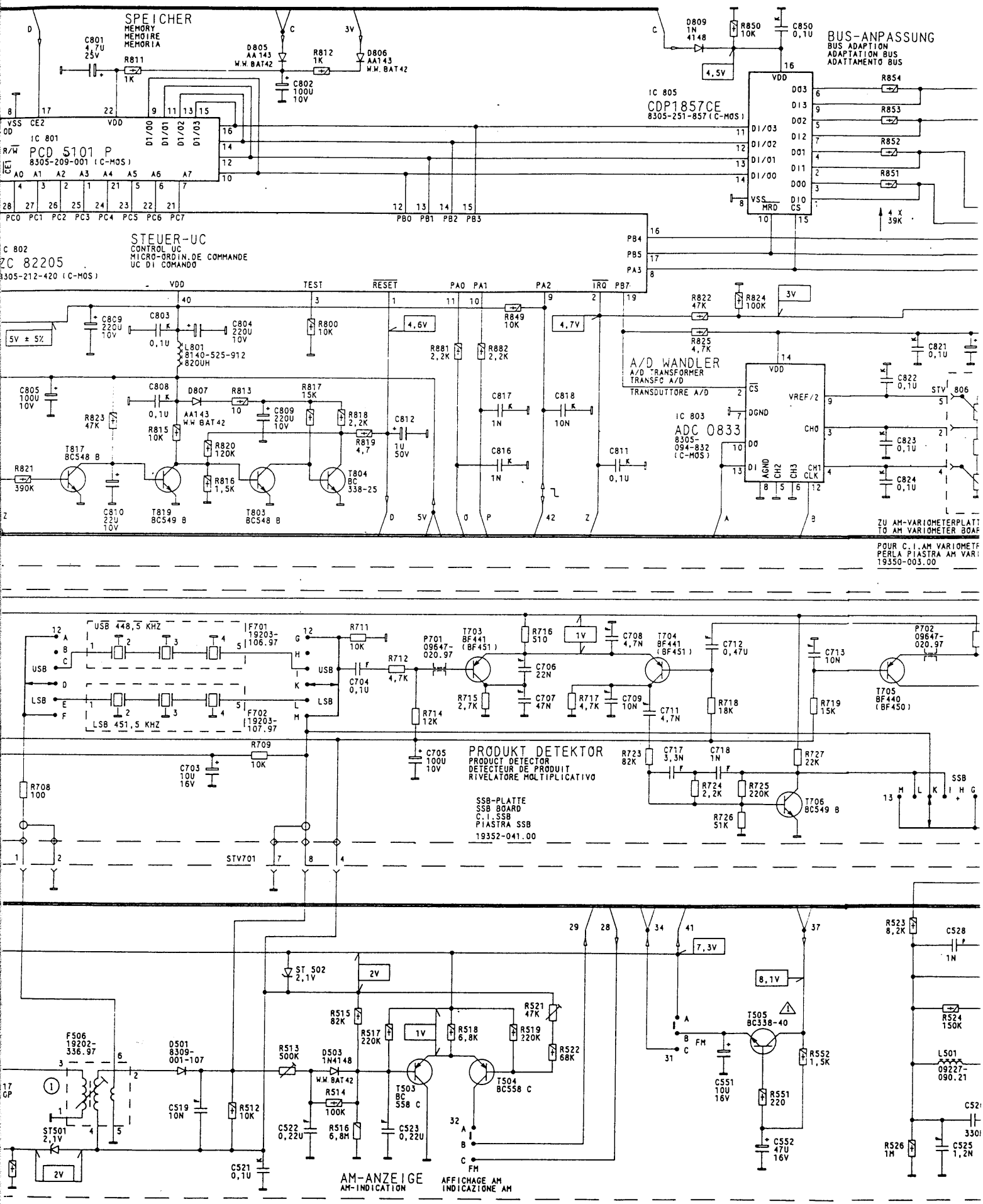
53-8100	IC 802				
	PIN 34	PIN 32	PIN 31	PIN 30	PIN 29
	PD 5	PD 3	PD 2	PD 1	PD Ø
	X	X	1	Ø	Ø
KW	X	Ø [1]	Ø	Ø	1
MW	X	X	Ø	1	Ø
LW	X	X	Ø	1	1
AUT. PRESEL	1	X	Ø	X	X

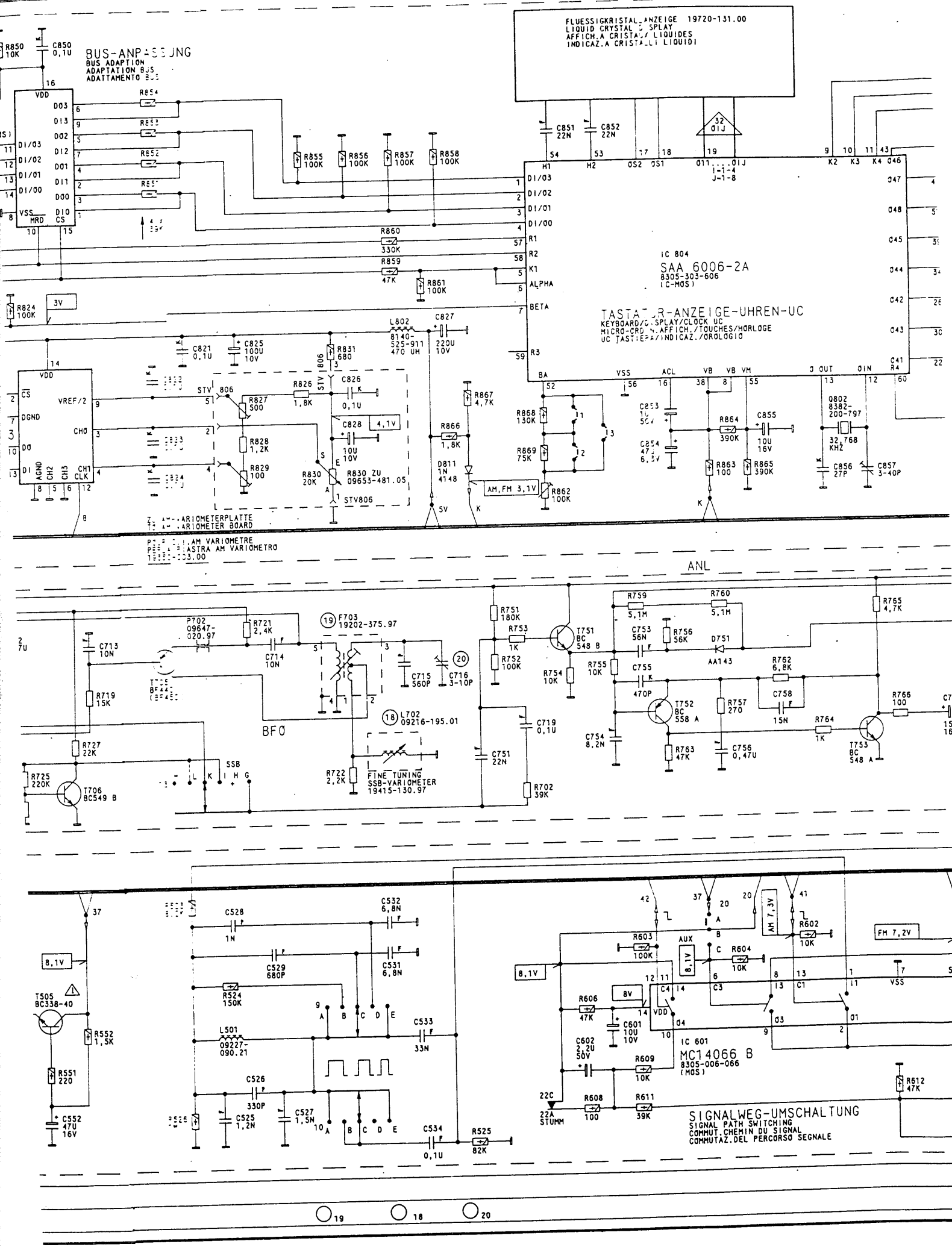
[1] 9.15053-6100
X ..... Ø ODER 1 - PEGEL

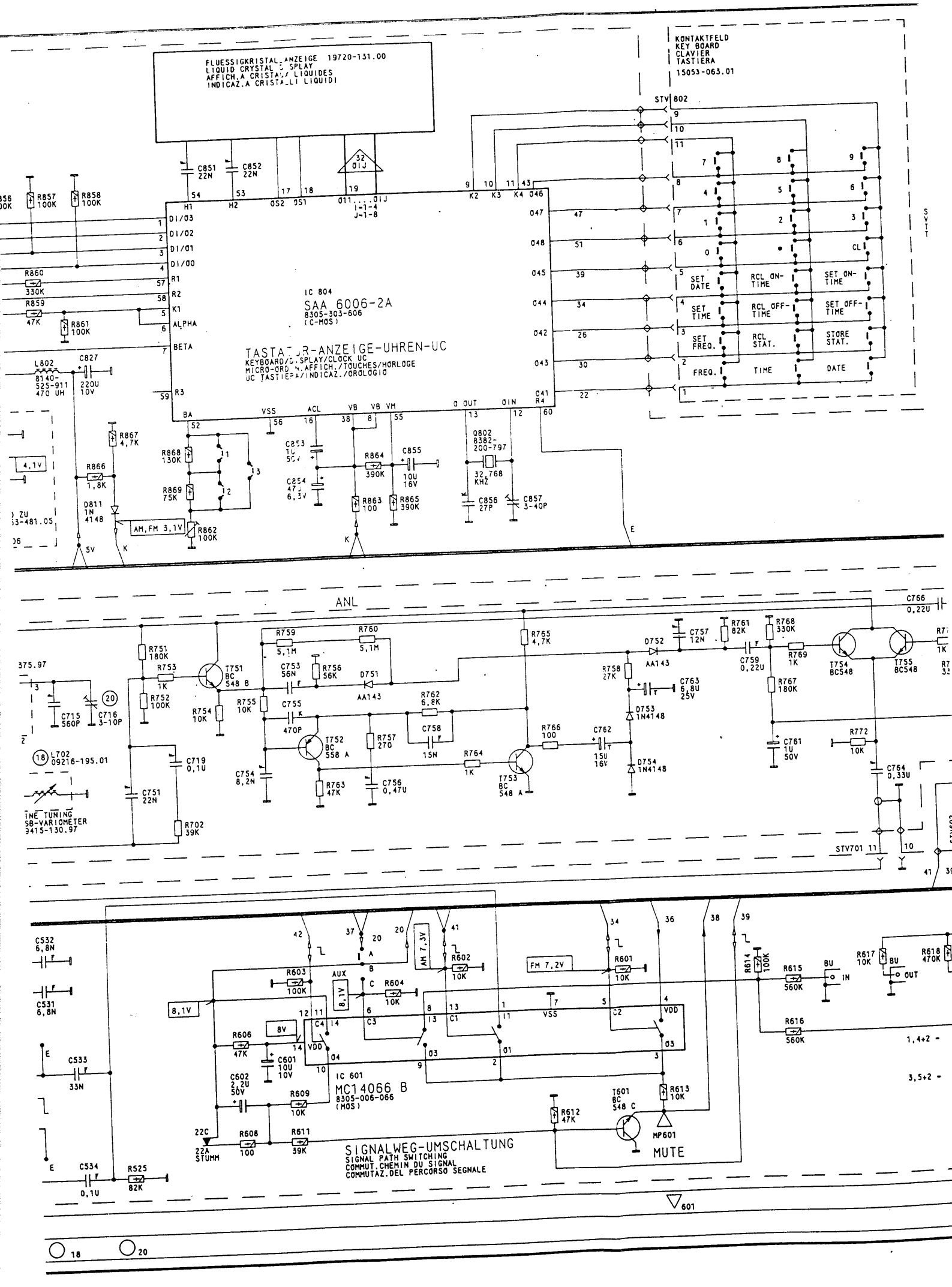
WELLENBEREICHE:	LW , GO , OL	148 - 420	KHZ	
WAVEBANDS:	MW , PO , OM	510 - 1620	KHZ	
GAMMES D'ONDES:	KW , SW , OC	1,6 - 26,1	MHZ	BEI 9.15053-8100
GAMME D'ONDA:	KW , SW , OC	1,6 - 30	MHZ	BEI 9.15053-6100
	FM	87,5- 108	MHZ	
	FM-ZF , FM-IF , MF-FI	10,7	MHZ	
	1. AM-ZF , AM-IF , AM-FI	54,5	MHZ	
	2. AM-ZF , AM-IF , AM-FI	450	KHZ	

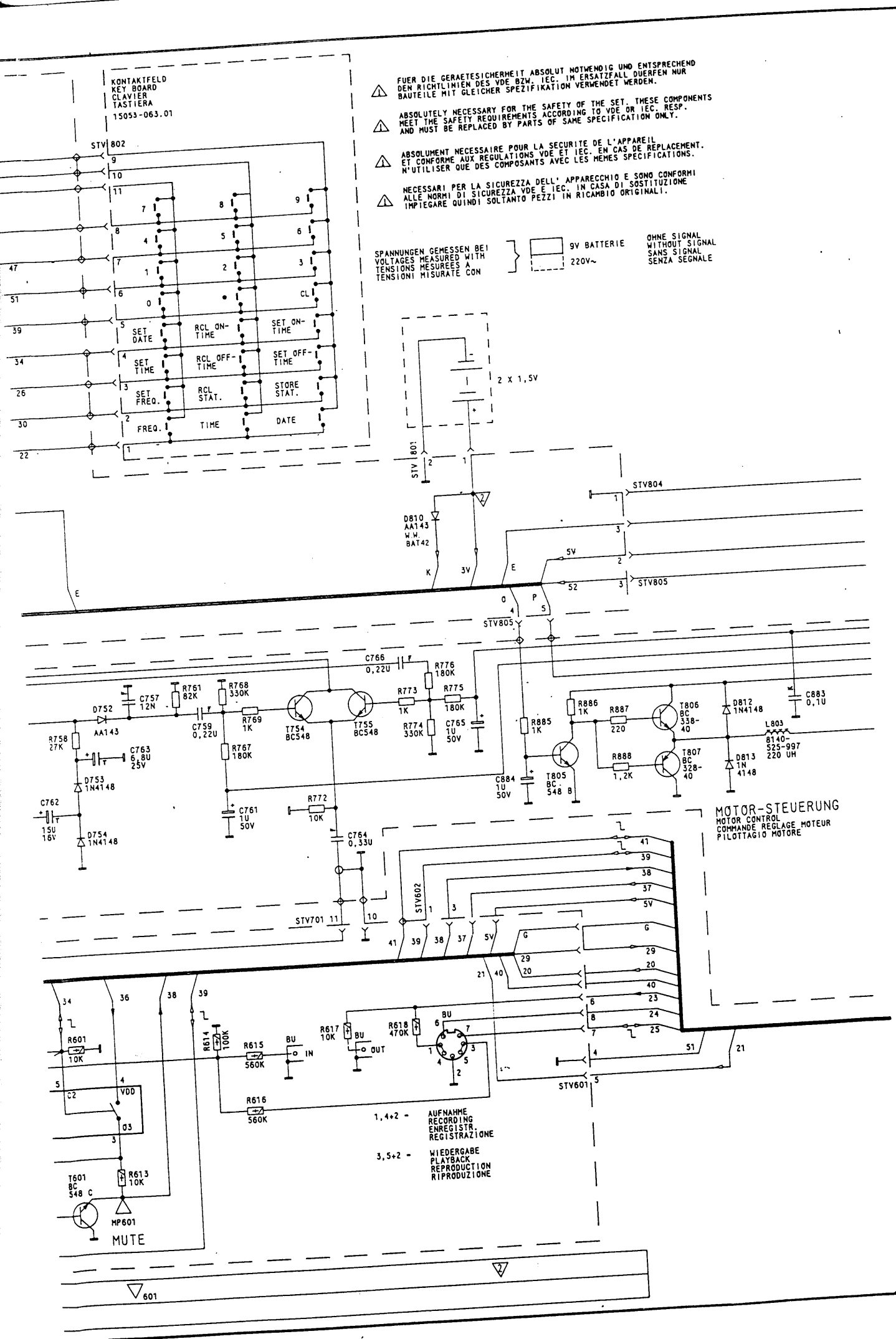

DIGITALBAUSTEIN / DIGITALE BOARD / C.I.DIGITALE / PIASTRA DIGITALE 19720-180.00
DIGITALPLATTE
DIGITALE BOARD
C.I.DIGITALE
PIASTRA DIGITALE
19372-044.00
STV803
R846 12K
C815 10N
R841 5,1M
R814 5,1M
C814 7-35P
C807 47P
Q801 4 MHZ 8382-241-496
C806 18P
R874 10K
T823 BC 548 C
R877 10K
C872 470P
C874 470P
R873 150K
D817 1N4148
C873 100P
R872 10K
T824 BC 548C
R876 150K
D818 1N 4148
R871 1K
C871 1N
R875 10K
R808 10K
R804 10K
R805 10K
L805 8140-526 060 100UH
PA7 PB6 OSC2 OSC1 VSS TIMER PA5
PA6
PA4
PD0 PD1 PD2 PD5 PD4 PD3 PD6 PD7
C800 1N
STV807
STV808
STV803 1 2 STV805
GEBERPLATTE
GENERATOR BOARD
C.I.GENERATEUR
PIASTRA GENERATORE
19370-002.00
T801 - 802 BPX 81 (KLAR)
D801 - 802 LD 261 (EINGEFAERBT)
R801 220
R802 47K
R803 47K
D801 2 X LD261 III/IV/V
D802
T801 BPX 81 III/IV
T802 BPX81 III/IV
R845 150K
T818 BC548 B
R844 100K
AUX
SSB
R705 33
C701 22U 16V
R707 10K
R706 6,8K
C702 10U 16V
MGC AGC
STV701
NEHMERPLATTE
RECIVING BOARD
C.I.DE RECEPTION
PIASTRA RICEVITRICE
19370-003.00
2. AM-ZF
2. AM-IF
2. AM-FI
MP502
C501 2N
C502 12N
F502 19203-105.97
450 KHZ
C503 4,7N
C504 8,2N
C505 2,2N
R503 56
C520 100U 10V
0,12V
C506 270P
C508 15N
T501 BF441 (BF451)
F 503 19202-316.97
R502 3,3K
C507 47N
R510 3,9K
C516 100U 10V
C510 47N
D502 ZD2,7
F504 19202-317.97
C509 560P
C513 0,1U
C511 10U 16V
R504 1K
C515 47N
F505 19202-318.97
T502 BF440 (BF450)
MP503
C512 390P
C514 47N
R505 300
1V
EINSTELLBAR MIT R507
R506 3,3K
C517 560P
R507 500K
R508 1,2K
HF-ZF-PLATTE
RF-IF BOARD
C.I.AF-FI
PIASTRA AF-FI
19372-045.00
MESSPUNKTE
MEASURING POINTS
ABGLEICHPUNKTE
ALIGNMENT POINTS
502
503
IV
III
II
I

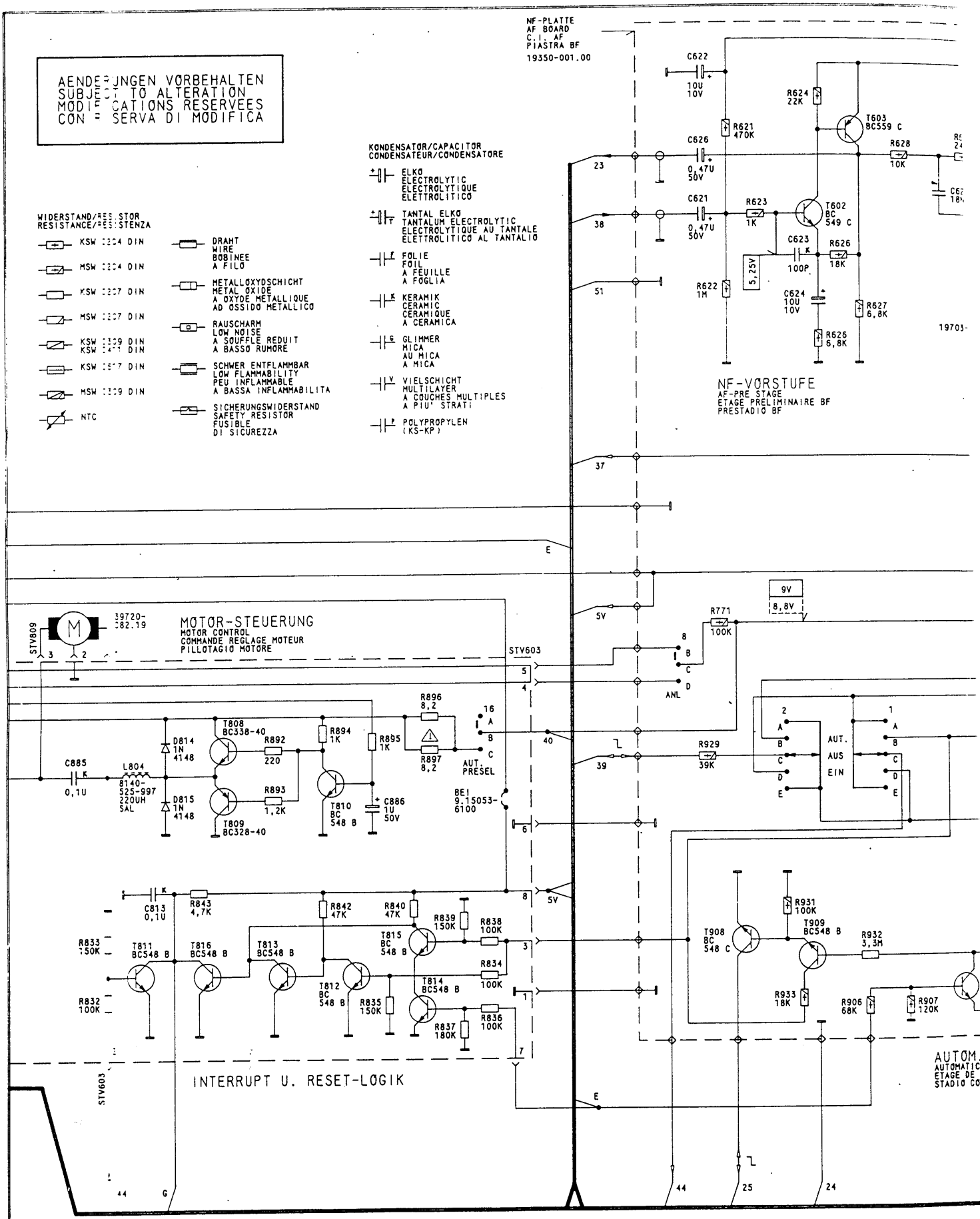

SPEICHER
MEMORY
MEMOIRE
MEMORIA
IC 801
PCD 5101 P
8305-209-001 (C-MOS)
IC 802
ZC 82205
8305-212-420 (C-MOS)
STEUER-UC
CONTROL UC
MICRO-ORDIN.DE COMMANDE
UC DI COMANDO
5V ± 5%
NEHMERPLATTE
RECIVING BOARD
C.I.DE RECEPTION
PIASTRA RICEVITRICE
19370-003.00
2. AM-ZF
2. AM-IF
2. AM-FI
EINSTELLBAR MIT R507
F 503 19202-316.97
F504 19202-317.97
F505 19202-318.97
F506 19202-336.97
F701 19203-106.97
F702 19203-107.97
USB 448,5 KHZ
LSB 451,5 KHZ
T501 BF441 (BF451)
T502 BF440 (BF450)
T801 BPX 81 III/IV
T802 BPX81 III/IV
T817 BC548 B
T818 BC548 B
T819 BC549 B
T803 BC548 B
D501 8309-001-107
D502 ZD2,7
D503 1N414
D805 AA143 W.W BAT42
D807 AA143 W.W BAT42
D818 1N 4148
ST501 2,1V
ST 502 2,1V
Q801 4 MHZ 8382-241-496
L801 8140-525-912 820UH
L805 8140-526-060 100UH


SPEICHER
MEMORY
MEMOIRE
MEMORIA
IC 801
PCD 5101 P
8305-209-001 (C-MOS)
STEUER-UC
CONTROL UC
MICRO-ORDIN.DE COMMANDE
UC DI COMANDO
IC 802
ZC 82205
8305-212-420 (C-MOS)
BUS-ANPASSUNG
BUS ADAPTION
ADAPTATION BUS
ADATTAMENTO BUS
IC 805
CDP1857CE
8305-251-857 (C-MOS)
A/D WANDLER
A/D TRANSFORMER
TRANSFO A/D
TRANSDUTTORE A/D
IC 803
ADC 0833
8305-094-832
(C-MOS)
ZU AM-VARIOMETERPLATT
TO AM VARIOMETER BOAR
POUR C.I.AM VARIOMETR
PERLA PIASTRA AM VARI
19350-003.00
PRODUKT DETEKTOR
PRODUCT DETECTOR
DETECTEUR DE PRODUIT
RIVELATORE MOLTIPLICATIVO
SSB-PLATTE
SSB BOARD
C.I.SSB
PIASTRA SSB
19352-041.00
AM-ANZEIGE
AM-INDICATION
AFFICHAGE AM
INDICAZIONE AM

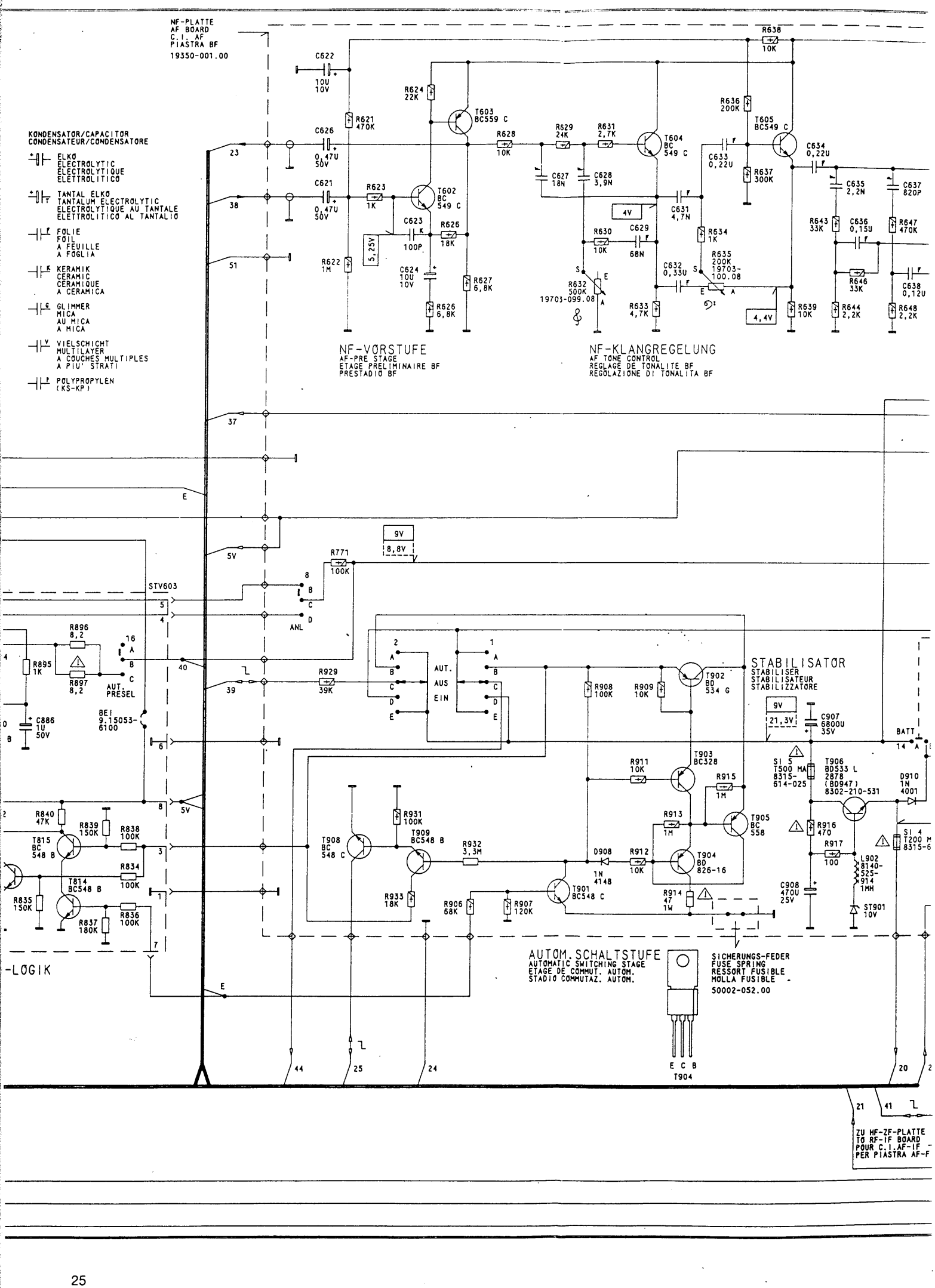

BUS-ANPASSUNG
BUS ADAPTION
ADAPTATION BUS
ADATTAMENTO BUS
FLUESSIGKRISTALL-ANZEIGE 19720-131.00
LIQUID CRYSTAL DISPLAY
AFFICH.A CRISTAUX LIQUIDES
INDICAZ.A CRISTALLI LIQUIDI
IC 804
SAA 6006-2A
8305-303-606
(C-MOS)
TASTATUR-ANZEIGE-UHREN-UC
KEYBOARD/DISPLAY/CLOCK UC
MICRO-CRD.-AFFICH./TOUCHES/HORLOGE
UC TASTIERA/INDICAZ./OROLOGIO
AM-VARIOMETERPLATTE
AM-VARIOMETER BOARD
PLAQUETTE AM VARIOMETRE
PIASTRA AM VARIOMETRO
19355-003.00
ANL
BFO
SSB
FINE TUNING
SSB-VARIOMETER
19415-130.97
IC 601
MC14066 B
8305-006-066
(MOS)
SIGNALWEG-UMSCHALTUNG
SIGNAL PATH SWITCHING
COMMUT.CHEMIN DU SIGNAL
COMMUTAZ.DEL PERCORSO SEGNALE

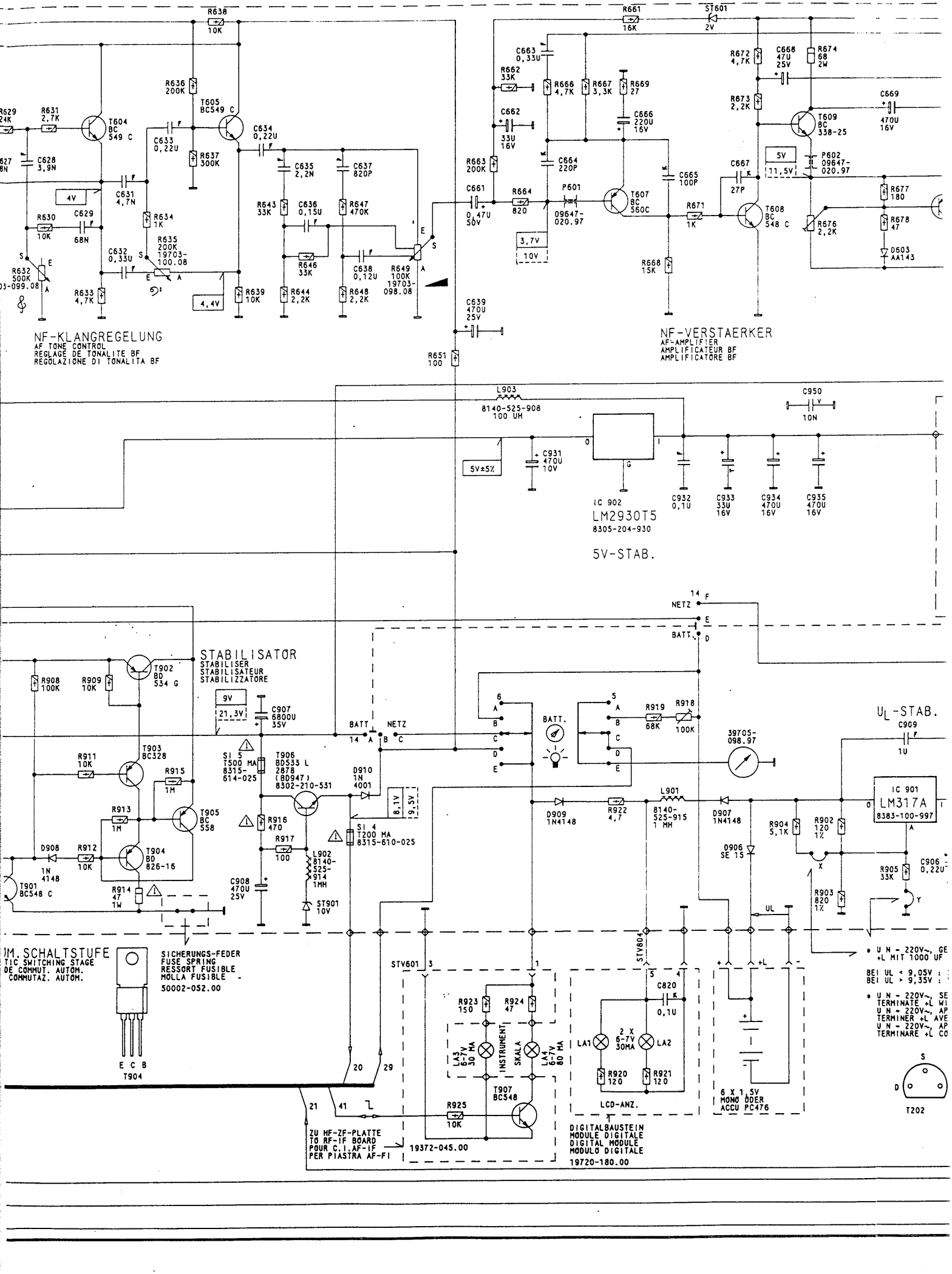

FLUESSIGKRISTAL-ANZEIGE 19720-131.00
LIQUID CRYSTAL DISPLAY
AFFICH.A CRISTAUX LIQUIDES
INDICAZ.A CRISTALLI LIQUIDI
KONTAKTFELD
KEY BOARD
CLAVIER
TASTIERA
15053-063.01
IC 804
SAA 6006-2A
8305-303-606
(C-MOS)
TASTATUR-ANZEIGE-UHREN-UC
KEYBOARD/DISPLAY/CLOCK UC
MICRO-ORD.AFFICH./TOUCHES/HORLOGE
UC TASTIERA/INDICAZ./OROLOGIO
SET DATE
RCL ON-TIME
SET ON-TIME
SET TIME
RCL OFF-TIME
SET OFF-TIME
SET FREQ.
RCL STAT.
STORE STAT.
FREQ.
TIME
DATE
ANL
TUNE TUNING
SB-VARIOMETER
3415-130.97
SIGNALWEG-UMSCHALTUNG
SIGNAL PATH SWITCHING
COMMUT.CHEMIN DU SIGNAL
COMMUTAZ.DEL PERCORSO SEGNALE
IC 601
MC14066 B
8305-006-066
(MOS)
MUTE
STUMM

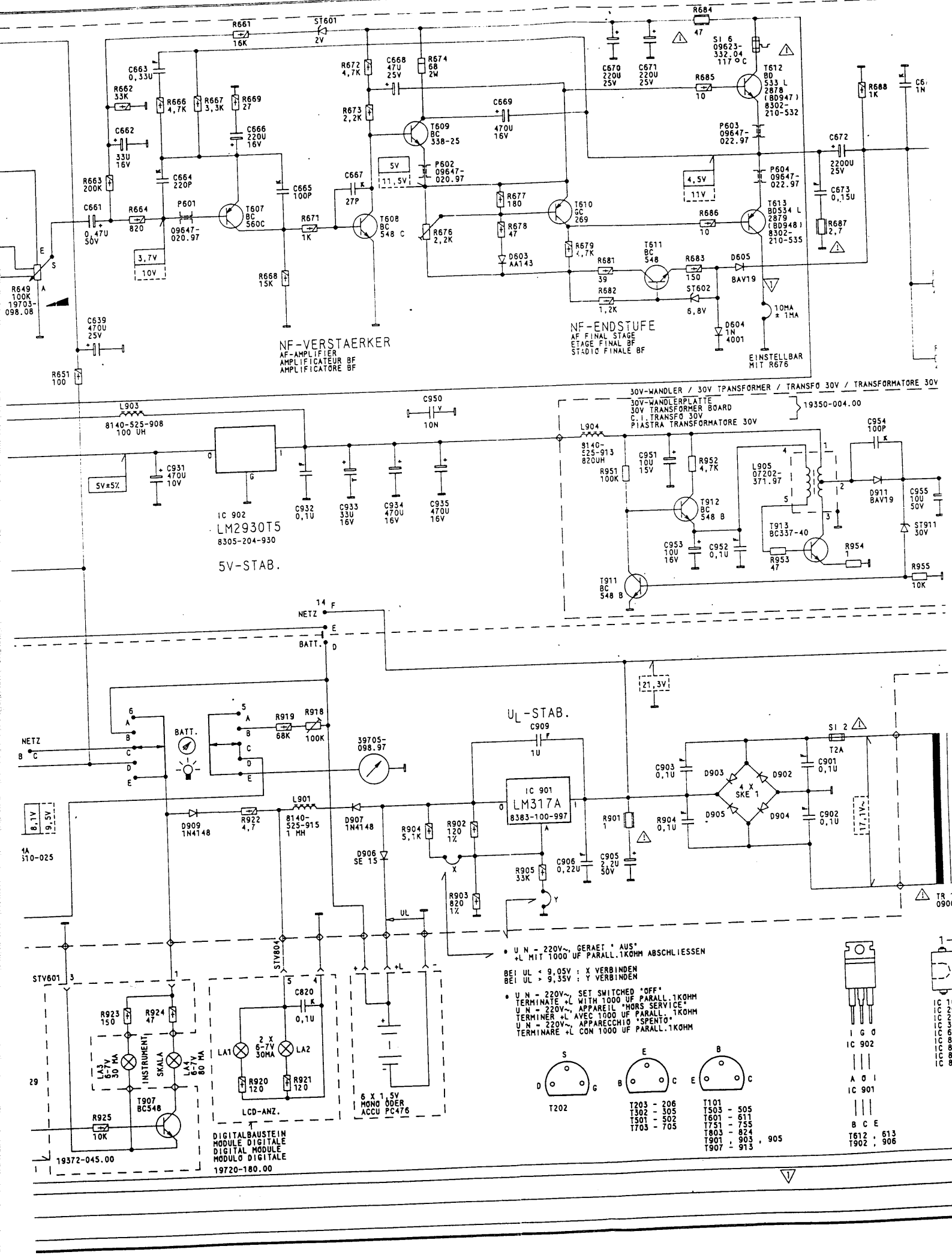

KONTAKTFELD
KEY BOARD
CLAVIER
TASTIERA
15053-063.01
STV 802
SET DATE
RCL ON-TIME
SET ON-TIME
SET TIME
RCL OFF-TIME
SET OFF-TIME
SET FREQ.
RCL STAT.
STORE STAT.
FREQ.
TIME
DATE
CL
FUER DIE GERAETESICHERHEIT ABSOLUT NOTWENDIG UND ENTSPRECHEND DEN RICHTLINIEN DES VDE BZW. IEC. IM ERSATZFALL DUERFEN NUR BAUTEILE MIT GLEICHER SPEZIFIKATION VERWENDET WERDEN.
ABSOLUTELY NECESSARY FOR THE SAFETY OF THE SET. THESE COMPONENTS MEET THE SAFETY REQUIREMENTS ACCORDING TO VDE OR IEC. RESP. AND MUST BE REPLACED BY PARTS OF SAME SPECIFICATION ONLY.
ABSOLUMENT NECESSAIRE POUR LA SECURITE DE L'APPAREIL ET CONFORME AUX REGULATIONS VDE ET IEC. EN CAS DE REPLACEMENT. N'UTILISER QUE DES COMPOSANTS AVEC LES MEMES SPECIFICATIONS.
NECESSARI PER LA SICUREZZA DELL' APPARECCHIO E SONO CONFORMI ALLE NORMI DI SICUREZZA VDE E IEC. IN CASA DI SOSTITUZIONE IMPIEGARE QUINDI SOLTANTO PEZZI IN RICAMBIO ORIGINALI.
SPANNUNGEN GEMESSEN BEI VOLTAGES MEASURED WITH TENSIONS MESUREES A TENSIONI MISURATE CON
9V BATTERIE
220V~
OHNE SIGNAL
WITHOUT SIGNAL
SANS SIGNAL
SENZA SEGNALE
2 X 1,5V
STV 801
D810 AA143 W.W. BAT42
STV804
STV805
C766 0,22U
R776 180K
R773 1K
R775 180K
R774 330K
C765 1U 50V
T754 BC548
T755 BC548
R752 AA143
C757 12N
R761 82K
C759 0,22U
R768 330K
R769 1K
R767 180K
R758 27K
C763 6,8U 25V
D753 1N4148
C762 15U 16V
D754 1N4148
C761 1U 50V
R772 10K
C764 0,33U
R885 1K
R886 1K
R887 220
R888 1,2K
T805 BC 548 B
T806 BC 338-40
T807 BC 328-40
D812 1N4148
D813 1N 4148
C883 0,1U
L803 8140-525-997 220 UH
C884 1U 50V
MOTOR-STEUERUNG
MOTOR CONTROL
COMMANDE REGLAGE MOTEUR
PILOTTAGIO MOTORE
STV602
STV701
STV601
R601 10K
R614 100K
R615 560K
R616 560K
R617 10K
R618 470K
BU
IN
OUT
C2
VDD
Q3
T601 BC 548 C
R613 10K
MP601
MUTE
1,4+2 - AUFNAHME RECORDING ENREGISTR. REGISTRAZIONE
3,5+2 - WIEDERGABE PLAYBACK REPRODUCTION RIPRODUZIONE
601

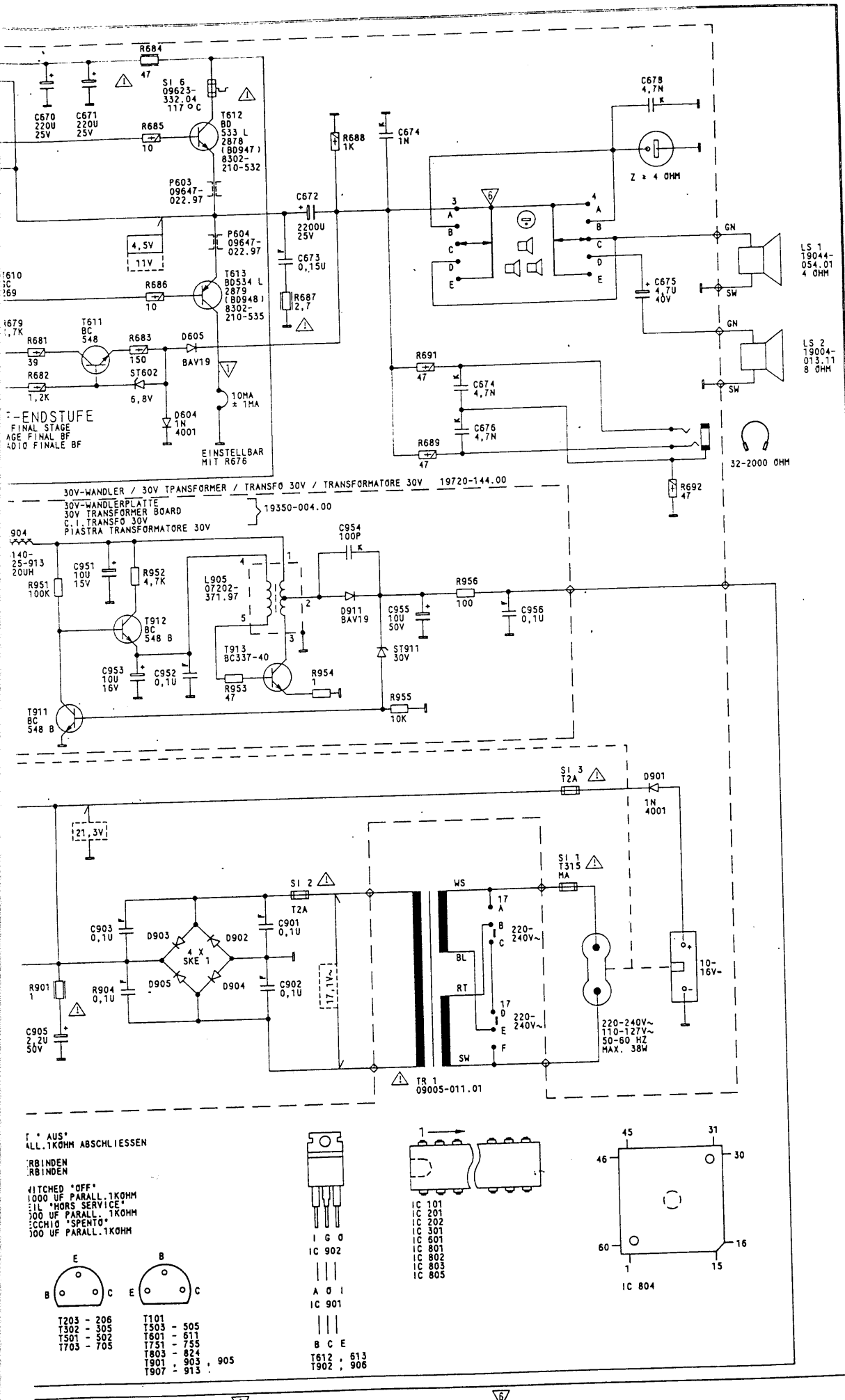


For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com


NF-PLATTE
AF BOARD
C.I. AF
PIASTRA BF
19350-001.00
KONDENSATOR/CAPACITOR
CONDENSATEUR/CONDENSATORE
ELKO
ELECTROLYTIC
ELECTROLYTIQUE
ELETTROLITICO
TANTAL ELKO
TANTALUM ELECTROLYTIC
ELECTROLYTIQUE AU TANTALE
ELETTROLITICO AL TANTALIO
FOLIE
FOIL
A FEUILLE
A FOGLIA
KERAMIK
CERAMIC
CERAMIQUE
A CERAMICA
GLIMMER
MICA
AU MICA
A MICA
VIELSCHICHT
MULTILAYER
A COUCHES MULTIPLES
A PIU' STRATI
POLYPROPYLEN
(KS-KP)
NF-VORSTUFE
AF-PRE STAGE
ETAGE PRELIMINAIRE BF
PRESTADIO BF
NF-KLANGREGELUNG
AF TONE CONTROL
REGLAGE DE TONALITE BF
REGOLAZIONE DI TONALITA BF
STABILISATOR
STABILISER
STABILISATEUR
STABILIZZATORE
AUTOM. SCHALTSTUFE
AUTOMATIC SWITCHING STAGE
ETAGE DE COMMUT. AUTOM.
STADIO COMMUTAZ. AUTOM.
SICHERUNGS-FEDER
FUSE SPRING
RESSORT FUSIBLE
MOLLA FUSIBLE
50002-052.00
-LOGIK
ZU HF-ZF-PLATTE
TO RF-IF BOARD
POUR C.I. AF-IF
PER PIASTRA AF-F
AUT.
AUS
EIN
AUT. PRESEL
ANL
BEI 9.15053-6100
STV603
E C B
T904


NF-KLANGREGELUNG
AF TONE CONTROL
REGLAGE DE TONALITE BF
REGOLAZIONE DI TONALITA BF
NF-VERSTAERKER
AF-AMPLIFIER
AMPLIFICATEUR BF
AMPLIFICATORE BF
IC 902
LM2930T5
8305-204-930
5V-STAB.
STABILISATOR
STABILISER
STABILISATEUR
STABILIZZATORE
UL-STAB.
IC 901
LM317A
8383-100-997
NETZ
BATT.
T902 BD 534 G
T903 BC328
T904 BD 826-16
T905 BC 558
T906 BD533 L 2878 (BD947) 8302-210-531
T907 BC548
T901 BC548 C
T604 BC 549 C
T605 BC549 C
T609 BC 338-25
T607 BC 560C
T608 BC 548 C
L901 8140-525-915 1 MH
L902 8140-525-914 1MH
L903 8140-525-908 100 UH
ST601 2V
ST901 10V
D909 1N4148
D907 1N4148
D906 SE 15
D908 1N 4148
D910 1N 4001
D0503 AA143
SI 5 T500 MA 8315-614-025
SI 4 T200 MA 8315-610-025
39705-098.97
P601 09647-020.97
P602 09647-020.97
6 X 1,5V MONO ODER ACCU PC476
LCD-ANZ.
DIGITALBAUSTEIN
MODULE DIGITALE
DIGITAL MODULE
MODULO DIGITALE
19720-180.00
19372-045.00
ZU HF-ZF-PLATTE
TO RF-IF BOARD
POUR C.I.AF-IF
PER PIASTRA AF-FI
SICHERUNGS-FEDER
FUSE SPRING
RESSORT FUSIBLE
MOLLA FUSIBLE
50002-052.00
E C B
T904
T202
STV601
STV804
INSTRUMENT
SKALA
LA1
LA2
LA3 6-7V 30 MA
LA4 6-7V 80 MA
2 X 6-7V 30MA
21,3V
9V
4V
4,4V
5V±5%
3,7V
10V
11,5V
8,1V
9,5V
R638 10K
R636 200K
R637 300K
R639 10K
R631 2,7K
R628 3,9N
R629 24K
R630 10K
R629 68N
R632 500K 19703-099.08
R633 4,7K
R634 1K
R635 200K 19703-100.08
R643 33K
R644 2,2K
R646 33K
R647 470K
R648 2,2K
R649 100K 19703-098.08
R651 100
R661 16K
R662 33K
R663 200K
R664 820
R666 4,7K
R667 3,3K
R669 27
R671 1K
R672 4,7K
R673 2,2K
R674 68 2W
R676 2,2K
R677 180
R678 47
R668 15K
R908 100K
R909 10K
R911 10K
R912 10K
R913 1M
R914 47 1W
R915 1M
R916 470
R917 100
R918 100K
R919 68K
R922 4,7
R923 150
R924 47
R925 10K
R920 120
R921 120
R902 120 1%
R903 820 1%
R904 5,1K
R905 33K
C633 0,22U
C634 0,22U
C635 2,2N
C636 0,15U
C637 820P
C638 0,12U
C639 470U 25V
C628 3,9N
C629 68N
C631 4,7N
C632 0,33U
C661 0,47U 50V
C662 33U 16V
C663 0,33U
C664 220P
C665 100P
C666 220U 16V
C667 27P
C668 47U 25V
C669 470U 16V
C907 6800U 35V
C908 470U 25V
C909 1U
C931 470U 10V
C932 0,1U
C933 33U 16V
C934 470U 16V
C935 470U 16V
C950 10N
C820 0,1U
C906 0,22U
IM. SCHALTSTUFE
TIC SWITCHING STAGE
DE COMMUT. AUTOM.
COMMUTAZ. AUTOM.


NF-VERSTAERKER
AF-AMPLIFIER
AMPLIFICATEUR BF
AMPLIFICATORE BF
NF-ENDSTUFE
AF FINAL STAGE
ETAGE FINAL BF
STADIO FINALE BF
EINSTELLBAR MIT R676
30V-WANDLER / 30V TRANSFORMER / TRANSFO 30V / TRANSFORMATORE 30V
30V-WANDLERPLATTE
30V TRANSFORMER BOARD
C.I. TRANSFO 30V
PIASTRA TRASFORMATORE 30V
19350-004.00
5V-STAB.
IC 902
LM2930T5
8305-204-930
UL-STAB.
IC 901
LM317A
8383-100-997
NETZ
BATT.
LCD-ANZ.
DIGITALBAUSTEIN
MODULE DIGITALE
DIGITAL MODULE
MODULO DIGITALE
19720-180.00
19372-045.00
6 X 1,5V MONO ODER ACCU PC476
T202
T203 - 206
T302 - 305
T501 - 502
T703 - 705
T101
T503 - 505
T601 - 611
T751 - 755
T803 - 824
T901 , 903 , 905
T907 - 913
T612 , 613
T902 , 906


R684 47
SI 6 09623-332.04 117 °C
C670 220U 25V
C671 220U 25V
R685 10
T612 BD 533 L 2878 (BD947) 8302-210-532
P603 09647-022.97
P604 09647-022.97
4,5V
11V
R686 10
T613 BD534 L 2879 (BD948) 8302-210-535
C672 2200U 25V
C673 0,15U
R687 2,7
R688 1K
C674 1N
C678 4,7N
Z = 4 OHM
LS 1 19044-054.01 4 OHM
LS 2 19004-013.11 8 OHM
C675 4,7U 40V
GN
SW
R681 39
R682 1,2K
T611 BC 548
R683 150
ST602 6,8V
D605 BAV19
10MA ± 1MA
D604 1N 4001
EINSTELLBAR MIT R676
R691 47
C674 4,7N
C676 4,7N
R689 47
R692 47
32-2000 OHM
-ENDSTUFE
FINAL STAGE
AGE FINAL BF
ADIO FINALE BF
30V-WANDLER / 30V TPANSFORMER / TRANSFO 30V / TRANSFORMATORE 30V 19720-144.00
30V-WANDLERPLATTE
30V TRANSFORMER BOARD
C.I.TRANSFO 30V
PIASTRA TRANSFORMATORE 30V
19350-004.00
140-25-913 20UH
R951 100K
C951 10U 15V
R952 4,7K
T912 BC 548 B
C953 10U 16V
C952 0,1U
T911 BC 548 B
L905 07202-371.97
T913 BC337-40
R953 47
R954 1
R955 10K
C954 100P
D911 BAV19
ST911 30V
C955 10U 50V
R956 100
C956 0,1U
SI 3 T2A
D901 1N 4001
21,3V
SI 2 T2A
SI 1 T315 MA
WS
BL
RT
SW
220-240V~
10-16V~
220-240V~ 110-127V~ 50-60 HZ MAX. 38W
C903 0,1U
D903
4 X SKE 1
D902
D905
D904
C901 0,1U
C902 0,1U
17,1V~
R901 1
R904 0,1U
C905 2,2U 50V
TR 1 09005-011.01
* AUS*
ALL.1KOHM ABSCHLIESSEN
RBINDEN
RBINDEN
ITCHED *OFF*
000 UF PARALL.1KOHM
IL *HORS SERVICE*
00 UF PARALL. 1KOHM
CCHIO *SPENTO*
00 UF PARALL.1KOHM
T203 - 206
T302 - 305
T501 - 502
T703 - 705
T101
T503 - 505
T601 - 611
T751 - 755
T803 - 824
T901 , 903 , 905
T907 - 913
I G O
IC 902
A O I
IC 901
B C E
T612 , 613
T902 , 906
IC 101
IC 201
IC 202
IC 301
IC 601
IC 801
IC 802
IC 803
IC 805
IC 804

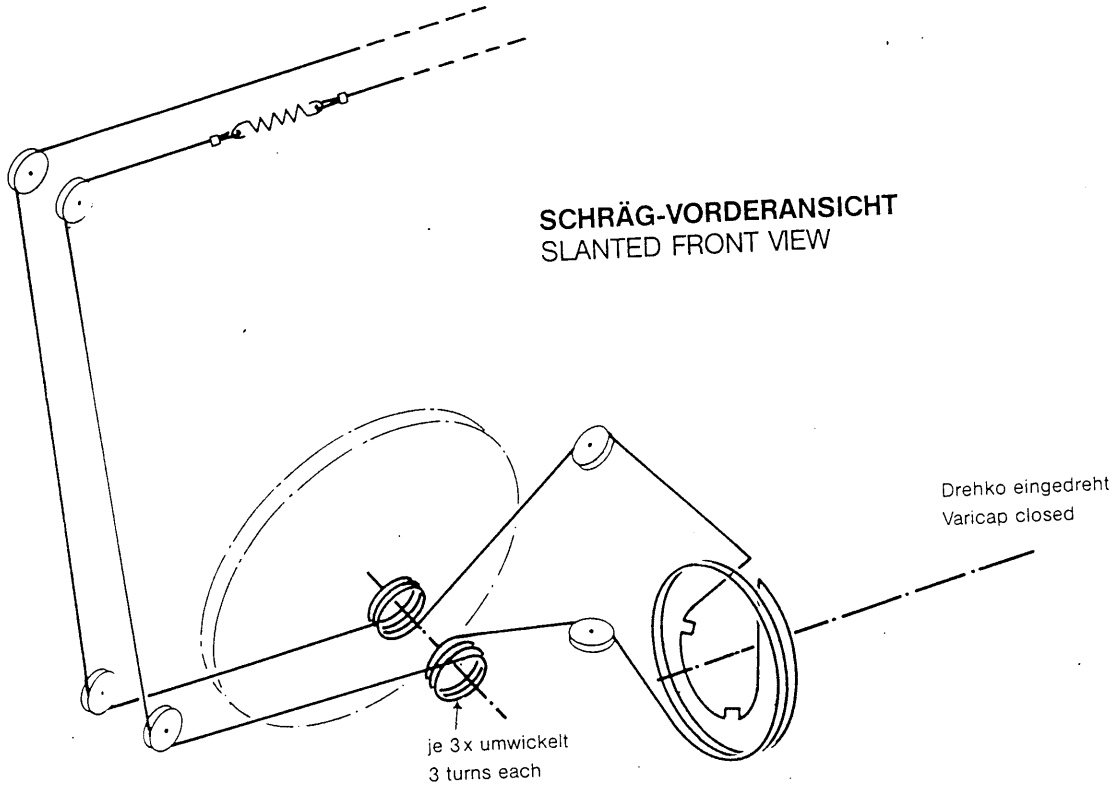
AM-FM-SEILZUG

Dehko eingedreht
Seillänge ca. 1825 mm

AM-FM-DIAL CORD

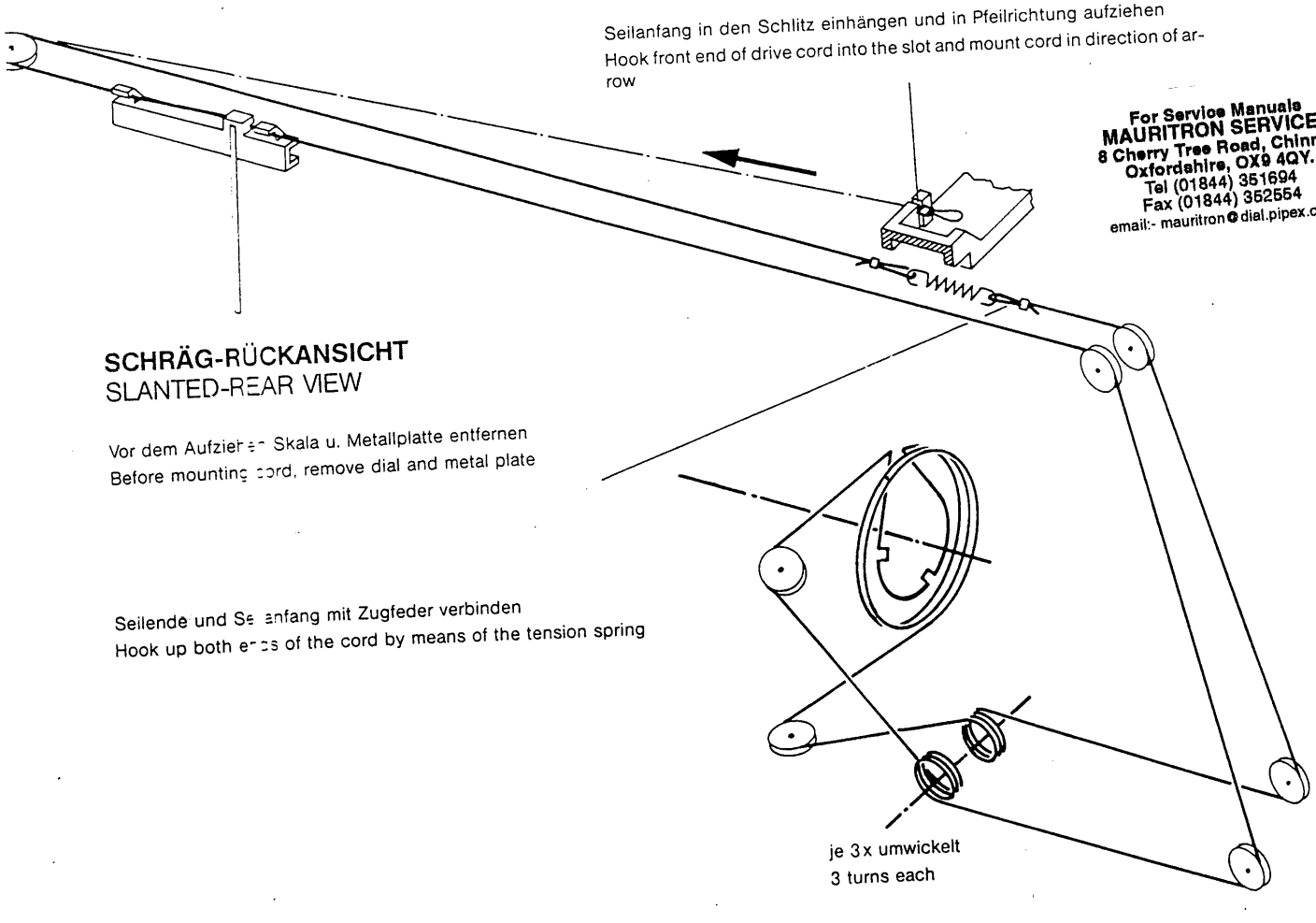
Varicap closed
Cord length approx. 1825 mm

Pos. No.



SCHRÄG-VORDERANSICHT
SLANTED FRONT VIEW

1
1
2
4
5
6
7
8
9
10
11
12
14
15
16
17
18
19


Seilanfang in den Schlitz einhängen und in Pfeilrichtung aufziehen
Hook front end of drive cord into the slot and mount cord in direction of arrow
Vor dem Aufziehen Skala u. Metallplatte entfernen
Before mounting cord, remove dial and metal plate
Seilende und Seilanfang mit Zugfeder verbinden
Hook up both ends of the cord by means of the tension spring
je 3x umwickelt
3 turns each

SCHRÄG-RÜCKANSICHT
SLANTED-REAR VIEW

For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com

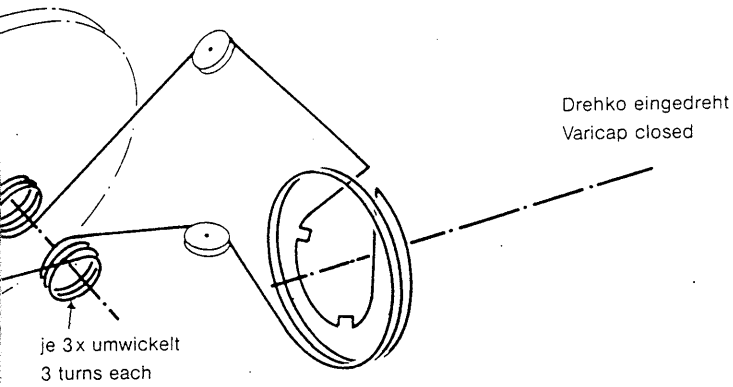
1

(12)150

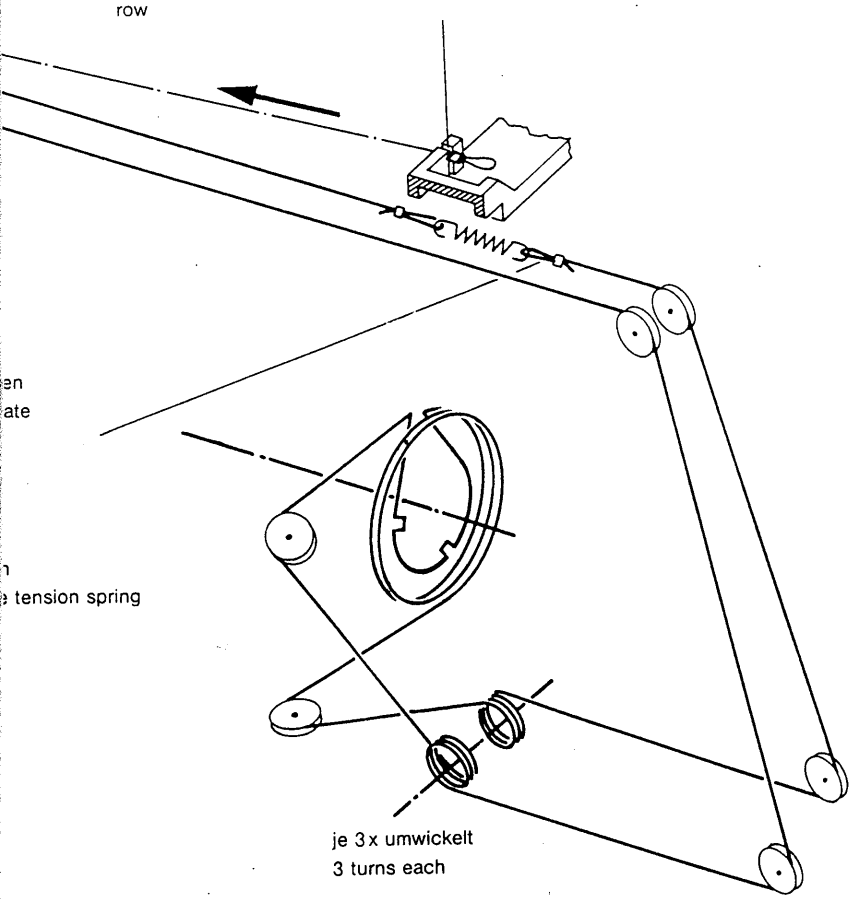
L CORD

prox. 1825 mm

SCHRÄG-VORDERANSICHT
SLANTED FRONT VIEW



Seilanfang in den Schlitz einhängen und in Pfeilrichtung aufziehen
Hook front end of drive cord into the slot and mount cord in direction of arrow



Pos. No.	Fig. No.	Bestell-Nr./Part No.		Bener
				Gehä
1	1	15053-012.01		Gehä
1	1	15053-011.01		Gehä
2	1	15053-063.01		Kont
4	1	15045-029.00	5x	Tast
5	1	15045-031.03		Scha
6		09619-863.00		Ring
7		39400-212.00		Druc
8	1	15045-032.03		Dreh
9		09619-864.00		Ring
10	1	15045-033.03		Gebe
11		09619-865.00		Ring
12	1	15045-022.01		Zier
14	1	15045-021.01	3x	Zier
15	1	15045-037.03		Dreh
16	1	15045-036.03	6x	Dreh
17	2	15045-023.00		Tast
18		15053-040.01		Gehä
19	1	09661-370.02		Trag

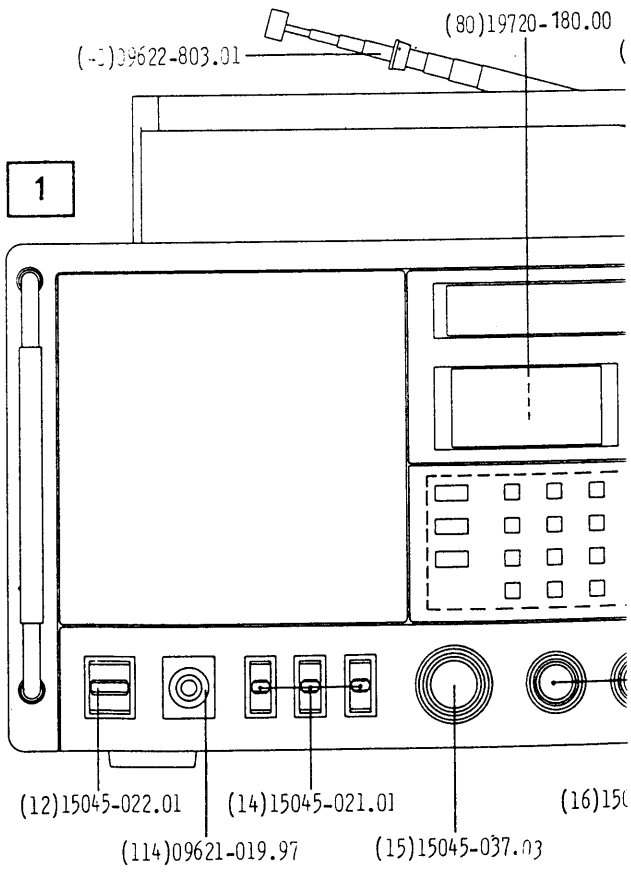
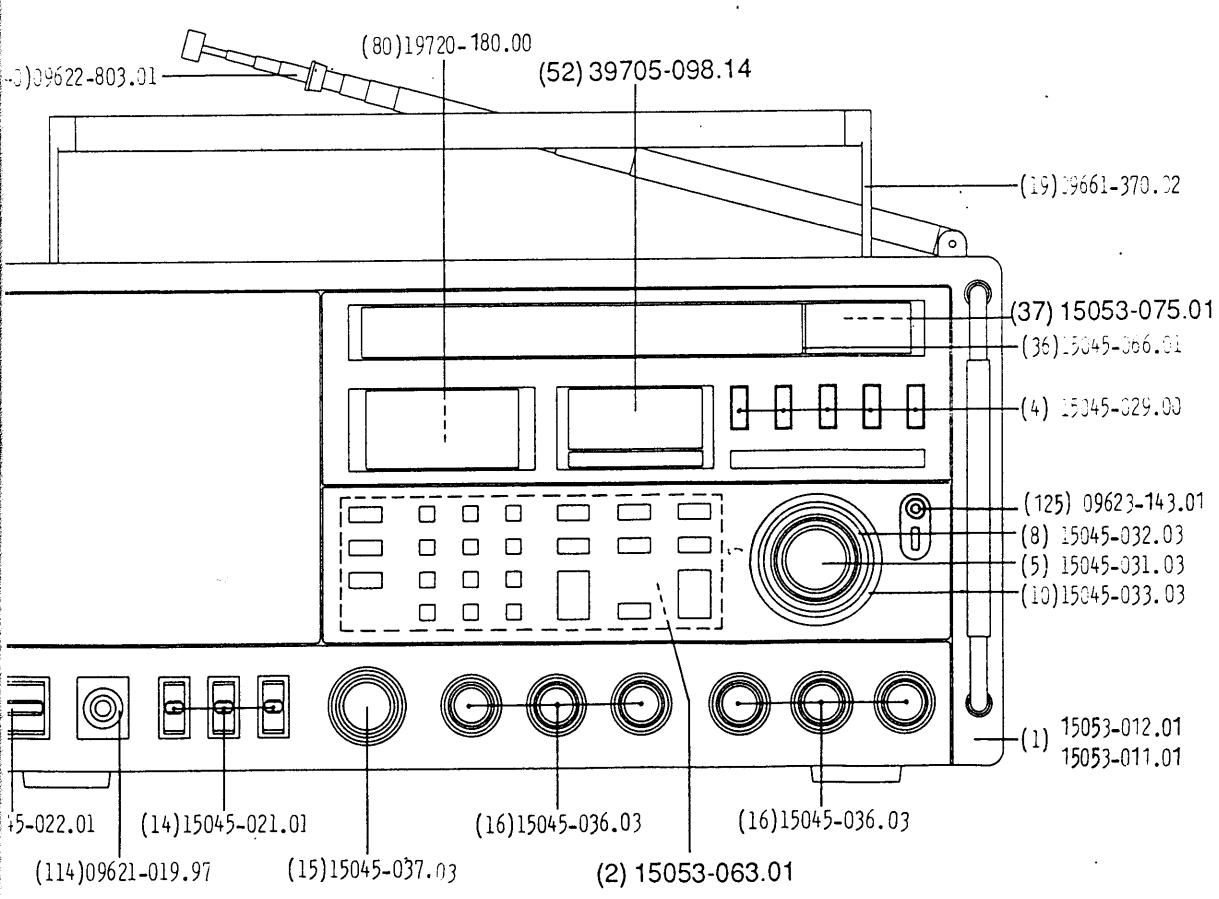


Fig. No.	Bestell-Nr./Part No.		Benennung	Description
			Gehäuse	Cabinet
1	15053-012.01		Gehäuse-Vorderteil (Prof.)	Front panel (Prof.)
1	15053-011.01		Gehäuse-Vorderteil (Int.)	Front panel (Int.)
1	15053-063.01		Kontaktfeld kpl.	Contact panel compl.
1	15045-029.00	5x	Tastenknopf	Button
1	15045-031.03		Schaltknopf	Switch knob
	09619-863.00		Ringfeder	Coil spring
	39400-212.00		Druckfeder	Compression spring
1	15045-032.03		Drehknopf	Rotary control knob
	09619-864.00		Ringfeder	Coil spring
1	15045-033.03		Geberknopf	Oscillator knob
	09619-865.00		Ringfeder	Coil spring
1	15045-022.01		Zierkappe, groß	Decorative cap, large
1	15045-021.01	3x	Zierkappe, klein	Decorative cap, small
1	15045-037.03		Drehknopf	Rotary control knob
1	15045-036.03	6x	Drehknopf	Rotary control knob
2	15045-023.00		Tastenknopf	Button
	15053-040.01		Gehäuse-Rückteil kpl.	Back panel compl.
1	09661-370.02		Tragegriff kpl.	Carrying handle compl.



Pos. No.	Fig. No.	Bestell-Nr./Part No.		Benennung	Description
					Spindle
20		09603-754.00	2x	Achse	Cover
21		15045-045.02		Deckel	Belt pulley
25	2	15045-089.00		Riemenscheibe	Generator wheel compl.
26		15045-087.00		Geberrad kpl.	Motor compl.
27	2	15045-195.00		Motor kpl.	Belt pulley
28	2	15045-190.00		Riemenscheibe	Drive belt
29	2	39721-567.00		Profilriemen	Cord pulley
30	2	09612-316.00	7x	Seilrolle	Drive cord TE50 P
31		8138-007-021		Antriebsschnur TE50 P (schwarz)	(black)
					Polyamide cord 0.3mm
33		8138-003-005		Polyamischnur 0,3 mm	Tension spring
34		09619-108.00		Zugfeder	Pointer guide
35		34057-055.00		Zeigerführung	Pointer
36	1	15045-066.01		Zeiger	Scale (Prof)
37	1	15053-074.01		Skala-Druck(Prof)	Scale (Int)
37	1	15053-075.01		Skala-Druck (Int)	Switch support
38	2	15045-054.00		Schalterstütze	Continuous switch button
39	2	19400-103.07		Fortschalttaste	Telescopic aerial
40	1	09622-803.01		Teleskopantenne	Connector compl.
41		01470-020.00	2x	Steckfassung kpl.	Mains transformer
42		09005-011.01		Netztrafo	Voltage selector
43	2	09626-892.00		Spannungswähler	Contact spring
45	2	09618-103.00	2x	Kontaktfeder	Contact spring
46	2	05113-223.00		Kontaktfeder	Contact spring
47	2	34059-061.00		Kontaktfeder	Contact plate
48	2	34059-062.00		Kontaktblech	Battery clip
49	2	15045-056.00		Batterie-Spange	Mains lead compl.
50		8290-991-050		Netzkabel mit Flachstecker und Zentralgerätesteckdose	Mains lead compl. (GB)
52	1	39705-098.14		Anzeigeinstrument	Meter
53		19104-021.05		Hochtonlautsprecher	Tweeter
54		19144-115.02		Rundlautsprecher	Spherical loudspeaker
55		19750-785.00		Dichtung	Seal
				HF-ZF-Platte	RF-IF Board
60		19706-062.00		Kontaktschieber 4-fach	Contact slider 4-way
61		19706-065.00		Drehschalter	Rotary switch
62	2	19400-093.07		Fortschalttaste	Button
63		15045-185.00		Aggregat kpl.	Assembly compl.
64	2	09623-094.01		Mikrofonbuchse	Microphone socket
65	2	09623-305.01		Chinchbuchse	Phono socket
66	2	09623-143.01		Koaxialstecker	Coaxial plug
67	2	09626-181.00		Klemmleiste	Termical strip
70		19370-002.00		GEBERPLATTE KPL.	Generator board compl.
75		19370-003.00		NEHMERPLATTE KPL.	Pickup board compl.
80	1	19720-180.00		DIGITAL-BAUSTEIN KPL.	Digital unit compl.
80.1		19720-150.00		Lichtleiter	Light spreader
80.2		09622-814.00	2x	Lampenfassung	Lamp socket
80.3		09623-308.01		IC-Fassung	IC socket
80.4		19720-149.00		Displayrahmen	Display frame
80.5		09631-351.00		Kontaktgummi 8,3mm	Contact rubber 8,3
80.6		09631-352.00		Kontaktgummi 12,6mm	Contact rubber 12,6

nnung	Description
	Spindle
l	Cover
nscheibe	Belt pulley
rad kpl.	Generator wheel compl.
kpl.	Motor compl.
nscheibe	Belt pulley
lriemen	Drive belt
olle	Cord pulley
ebsschnur TE50 P	Drive cord TE50 P
arz)	(black)
mischnur 0,3 mm	Polyamide cord 0.3mm
eder	Tension spring
erführung	Pointer guide
er	Pointer
-Druck(Prof)	Scale (Prof)
-Druck(Int)	Scale (Int)
lterstütze	Switch support
schalttaste	Continuous switch button
skopantenne	Telescopic aerial
fassung kpl.	Connector compl.
trafo	Mains transformer
ungswähler	Voltage selector
aktfeder	Contact spring
aktfeder	Contact spring
aktfeder	Contact spring
aktblech	Contact plate
erie-Spange	Battery clip
kabel mit	Mains lead compl.
nstecker und.	
-algerätesteckdose	Mains lead compl. (G8)
igeinstrument	Meter
tonlautsprecher	Tweeter
lautsprecher	Spherical loudspeaker
tung	Seal
-Platte	RF-IF Board
iktschieber 4-fach	Contact slider 4-way
schalter	Rotary switch
schalttaste	Button
gat kpl.	Assembly compl.
rfonbuchse	Microphone socket
chbuchse	Phono socket
aistecker	Coaxial plug
leiste	Termical strip
PLATTE KPL.	Generator board compl.
RPLATTE KPL.	Pickup board compl.
AL-BAUSTEIN.KPL.	Digital unit compl.
leiter	Light spreader
nfassung	Lamp socket
ssung	IC socket
layrahmen	Display frame
aktgummi 3,3mm	Contact rubber 8,3
aktgummi 12,6mm	Contact rubber 12,6

Pos. No.	Fig. No.	Bestell-Nr./Part No.		Benennung
90		19426-048.00		Ferritstabantenne kpl.
90.1		09648-901.01		Antennenstab
95	2	19415-129.00		AM-VARIOMETER
				SSB-Platte
105		19706-067.00		Drehschalter
106		19415-130.00		SSB-Variometer
				NF-Platte
110		19706-045.00		Kippschalter (ANL)
111		19706-046.00		Kippschalter (Netz)
112		19706-046.00		Kippschalter(Lautspr.)
113		19706-047.00		Kippschalter(Batt.)
114	1	09621-019.97		Stereo-Koaxialbuchse
115	2	09623-261.01		Lautsprecherbuchse
116	2	09623-171.01		Doppeleinbaustecker
117	2	09623-172.01		Spannungswähler
118		09621-113.02	4x	Sicherungshalter
119		15035-116.00		Distanzstück
				Peilantennenplatte
125		09623-143.01		Koaxialstecker
126		19706-043.00		Schiebeschalter BC-DF

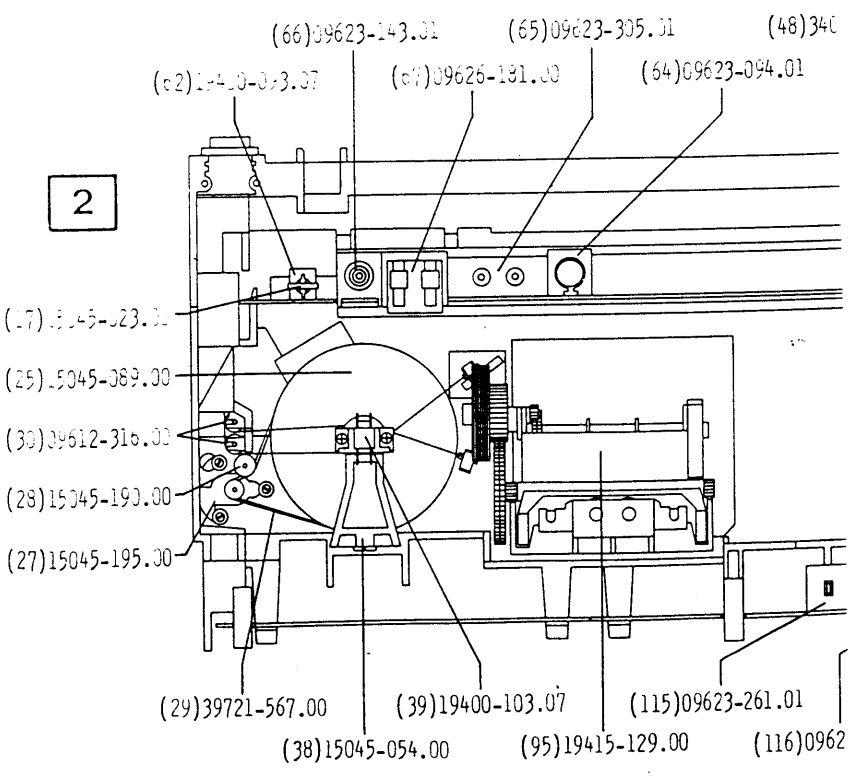
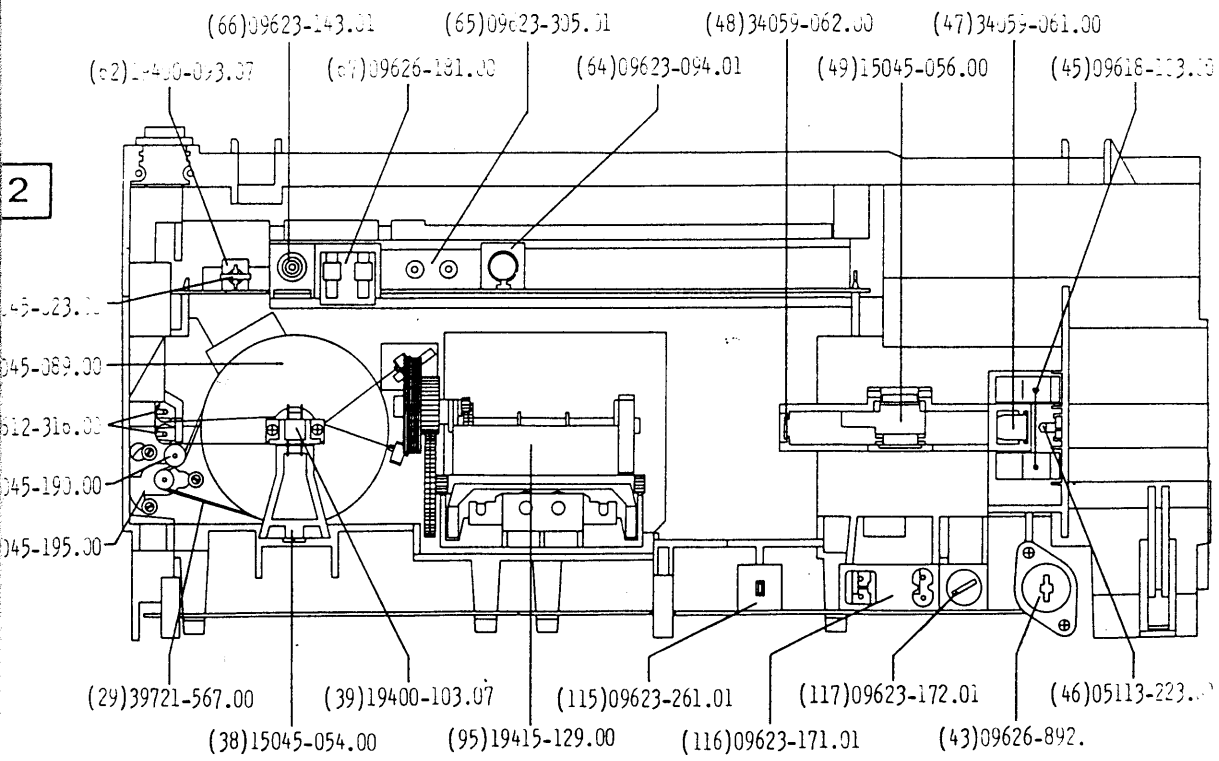


Fig. No.	Bestell-Nr./Part No.		Benennung	Description
	19426-048.00		Ferritstabantenne kpl.	Ferrite rod aerial compl.
1	09648-901.01		Antennenstab	Aerial rod
2	19415-129.00		AM-VARIOMETER	AM variometer
			SSB-Platte	SSB Board
	19706-067.00		Drehschalter	Rotary switch
	19415-130.00		SSB-Variometer	SSB variometer
			NF-Platte	AF Board
	19706-045.00		Kippschalter (ANL)	ANL switch
	19706-046.00		Kippschalter (Netz)	Mains switch
	19706-046.00		Kippschalter(Lautspr.)	Loudspeaker switch
	19706-047.00		Kippschalter(Batt.)	Battery switch
1	09621-019.97		Stereo-Koaxialbuchse	Headphone socket
2	09623-261.01		Lautsprecherbuchse	Loudspeaker socket
2	09623-171.01		Doppeleinbaustecker	Double connector
2	09623-172.01		Spannungswähler	Voltage selector
	09621-113.02	4x	Sicherungshalter	Fuse contact
	15035-116.00		Distanzstück	Spacing piece
			Peilantennenplatte	DF Antenna board
	09623-143.01		Koaxialstecker	Coaxial plug
	19706-043.00		Schiebeschalter BC-DF	Slide switch BC-DF



For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com

Pos.	Fig.	Bestell-Nr./Part No.	Benennung Description
			Elektrische Teile
		19720-13[illegible]	Flüssigkristallanzeige
		19720-14-[illegible]	30 V Wandler
		8316-216-[illegible]	Glimmlampe
P 201		09647-02[illegible]	
P 202		09647-02[illegible]	
P 203		09647-02[illegible]	
P 301		09647-02[illegible]	
P 302		09647-02[illegible]	
P 601		09647-02[illegible]	
P 602		09647-02[illegible]	
P 603		09647-02[illegible]	
P 604		09647-02[illegible]	
P 701		09647-02[illegible]	
P 702		09647-02[illegible]	
F 201		19202-62-[illegible]	
F 202		19202-62[illegible]	
F 301		07202-00[illegible]	
F 302		19203-02[illegible]	
F 303		19203-02[illegible]	
F 304		19203-02[illegible]	
F 305		19202-32[illegible]	
F 501		19202-3[illegible]	
F 502		19203-10[illegible]	
F 503		19202-31[illegible]	
F 504		19202-31[illegible]	
F 505		19202-31[illegible]	
F 506		19202-33[illegible]	
F 701		19203-10[illegible]	
F 702		19203-10[illegible]	
F 703		19202-3[illegible]	
L 101		8140-525-[illegible]	
L 200		8140-525-[illegible]	
L 204		8140-525-[illegible]	
L 205		09226-25[illegible]	
L 206		8140-525-[illegible]	
L 207		8140-525-[illegible]	
L 208		8140-525-[illegible]	
L 209		09226-23[illegible]	
L 211		8140-525-[illegible]	
L 212		8140-525-[illegible]	
L 301		8140-525-[illegible]	
L 302		09238-32[illegible]	
L 303		09238-33[illegible]	
L 304		09238-32[illegible]	
L 305		09226-23-[illegible]	
L 306		09218-19[illegible]	

MOS = Vorschriften beachten

MOS = observe MOS instr.

Pos.	Fig.	Bestell-Nr./Part No.	Benennung Description
			Electrical Parts
			Liquid crystal display
			30 V converter
			Neon lamp
L 805		8140-526-060	
L 405		8140-525-614	
L 501		09227-090.21	
L 801		8140-525-912	
L 802		8140-525-911	
L 803		8140-525-997	
L 804		8140-525-997	
L 901		8140-525-915	
L 902		8140-525-914	
L 903		8140-525-908	
Q 201/202		8382-261-297	
Q 203		8382-251-597	
Q 801		8382-241-496	
Q 802		8382-200-797	
IC 101		8305-303-057	SAA 1057 (MOS)
IC 201		8305-100-003	S 042 P
IC 202		8305-100-003	S 042 P
IC 301		8305-302-047	TDA 1047
IC 601		8305-006-066	HEF 4066 BP
IC 801		8305-209-001	PCD 5101 P (MOS)
IC 802		8305-212-420	ZC 82205 (MOS)
IC 803		8305-094-832	ADC 0833 (MOS)
IC 804		8305-303-606	SAA 6006-2 A (MOS)
IC 805		8305-251-857	CDP 1857 CE (MOS)
IC 901		8383-100-997	LM 317 A
IC 902		8305-204-930	LM 2930 T 5
T 101		8302-200-256	BC 338/40
T 203		8302-222-040	BF 440
T 204		8302-222-040	BF 440
T 205		8302-222-040	BF 440
T 206		8302-222-040	BF 440
T 301		8302-220-910	BF 910
T 302		8302-220-441	BF 441
T 303		8302-222-040	BF 440
T 304		8302-220-441	BF 441
T 305		8302-220-441	BF 441
T 401		8302-222-901	BF 961
T 501		8302-220-441	BF 441
T 502		8302-222-040	BF 440
T 503		8302-202-560	BC 558 C
T 504		8302-202-560	BC 558 C
T 505		8302-200-256	BC 338/40
T 601		8302-200-548	BC 548 C
T 602		8302-200-551	BC 549 C
T 603		8302-202-561	BC 559 C

Pos. No.
T 604
T 605
T 607
T 608
T 609
T 610
T 611
T 612
T 613
T 751
T 703
T 704
T 705
T 706
T 752
T 753
T 754
T 755
T 801
T 802
T 803
T 804
T 805
T 806
T 807
T 808
T 809
T 810
T 811
T 812
T 813
T 814
T 815
T 816
T 817
T 818
T 319
T 821
T 822
T 823
T 824
T 901
T 902
T 903
T 904
T 905
T 906
T 907
T 908
T 909

Pos.	Fig.	Bestell-Nr./Part No.	Benennung Description

Electrical Parts

Liquid crystal display
30 V converter
Neon lamp

L 805		8140-526-060
L 405		8140-525-614
L 501		09227-090.21
L 801		8140-525-912
L 802		8140-525-911
L 803		8140-525-997
L 804		8140-525-997
L 901		8140-525-915
L 902		8140-525-914
L 903		8140-525-908

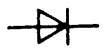
Q 201/202		8382-261-297
Q 203		8382-251-597
Q 801		8382-241-496
Q 802		8382-200-797

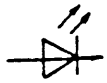
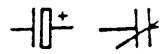
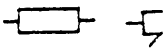
IC 101	8305-303-057	SAA 1057 (MOS)
IC 201	8305-100-003	S 042 P
IC 202	8305-100-003	S 042 P
IC 301	8305-302-047	TDA 1047
IC 601	8305-006-066	HEF 4066 BP
IC 801	8305-209-001	PCD 5101 P (MOS)
IC 802	8305-212-420	ZC 82205 (MOS)
IC 803	8305-094-832	ADC 0833 (MOS)
IC 804	8305-303-606	SAA 6006-2 A (MOS)
IC 805	8305-251-857	CDP 1857 CE (MOS)
IC 901	8383-100-997	LM 317 A
IC 902	8305-204-930	LM 2930 T 5

T 101	8302-200-256	BC 338/40
T 203	8302-222-040	BF 440
T 204	8302-222-040	BF 440
T 205	8302-222-040	BF 440
T 206	8302-222-040	BF 440
T 301	8302-220-910	BF 910
T 302	8302-220-441	BF 441
T 303	8302-222-040	BF 440
T 304	8302-220-441	BF 441
T 305	8302-220-441	BF 441
T 401	8302-222-901	BF 961
T 501	8302-220-441	BF 441
T 502	8302-222-040	BF 440
T 503	8302-202-560	BC 558 C
T 504	8302-202-560	BC 558 C
T 505	8302-200-256	BC 338/40
T 601	8302-200-548	BC 548 C
T 602	8302-200-551	BC 549 C
T 603	8302-202-561	BC 559 C

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
T 604		8302-200-551	BC 549 C
T 605		8302-200-551	BC 549 C
T 607		8302-202-567	BC 560 C
T 608		8302-200-548	BC 548 C
T 609		8302-200-169	BC 338-25
T 610		8302-400-108	GC 269
T 611		8302-202-538	BC 548
T 612		8302-210-532	BD 533 L
T 613		8302-210-535	BD 534 L
T 751		8302-202-543	BC 548 B
T 703		8302-220-441	BF 441
T 704		8302-220-441	BF 441
T 705		8302-222-040	BF 440
T 706		8302-200-550	BC 549 B
T 752		8302-200-555	BC 558 A
T 753		8302-200-589	BC 548 A
T 754		8302-202-538	BC 548
T 755		8302-202-538	BC 548
T 801		8302-293-079	BPX 81 III/IV
T 802		8302-293-079	BPX 81 III/IV
T 803		8302-202-543	BC 548 B
T 804		8302-200-169	BC 338-25
T 805		8302-202-543	BC 548 B
T 806		8302-200-171	BC 338-40
T 807		8302-200-176	BC 328-40
T 808		8302-200-171	BC 338-40
T 809		8302-200-176	BC 328-40
T 810		8302-202-543	BC 548 B
T 811		8302-202-543	BC 548 B
T 812		8302-202-543	BC 548 B
T 813		8302-202-543	BC 548 B
T 814		8302-202-543	BC 548 B
T 815		8302-202-543	BC 548 B
T 816		8302-202-543	BC 548 B
T 817		8302-202-543	BC 548 B
T 818		8302-202-543	BC 548 B
T 819		8302-202-543	BC 548 B
T 821		8302-200-548	BC 548 C
T 822		8302-200-548	BC 548 C
T 823		8302-200-548	BC 548 C
T 824		8302-200-548	BC 548 C
T 901		8302-200-548	BC 548 C
T 902		8302-212-534	BD 534 G
T 903		8302-200-070	BC 328
T 904		8302-210-836	BD 826-16
T 905		8302-202-558	BC 558
T 906		8302-210-532	BD 533 L
T 907		8302-202-538	BC 548
T 908		8302-200-548	BC 548 C
T 909		8302-200-548	BC 548 C

Fig. No.	Bestell-Nr./Part No.	Benennung Description
	8302-200-551	BC 549 C
	8302-200-551	BC 549 C
	8302-202-567	BC 560 C
	8302-200-548	BC 548 C
	8302-200-169	BC 338-25
	8302-400-108	GC 269
	8302-202-538	BC 548
	8302-210-532	BD 533 L
	8302-210-535	BD 534 L
	8302-202-543	BC 548 B
	8302-220-441	BF 441
	8302-220-441	BF 441
	8302-222-040	BF 440
	8302-200-550	BC 549 B
	8302-200-555	BC 558 A
	8302-200-589	BC 548 A
	8302-202-538	BC 548
	8302-202-538	BC 548
	8302-293-079	BPX 81 III/IV
	8302-293-079	BPX 81 III/IV
	8302-202-543	BC 548 B
	8302-200-169	BC 338-25
	8302-202-543	BC 548 B
	8302-200-171	BC 338-40
	8302-200-176	BC 328-40
	8302-200-171	BC 338-40
	8302-200-176	BC 328-40
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-202-543	BC 548 B
	8302-200-548	BC 548 C
	8302-200-548	BC 548 C
	8302-200-548	BC 548 C
	8302-200-548	BC 548 C
	8302-200-548	BC 548 C
	8302-212-534	BD 534 G
	8302-200-070	BC 328
	8302-210-836	BD 826-16
	8302-202-558	BC 558
	8302-210-532	BD 533 L
	8302-202-538	BC 548
	8302-200-548	BC 548 C
	8302-200-548	BC 548 C

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
			
D 101		8309-215-050	1N 4148
D 102		8309-215-050	1N 4148
D 103		8309-215-050	1N 4148
D 104		8309-215-050	1N 4148
D 201		8309-510-608	BB 609 B
D 202		8309-510-608	BB 609 B
D 203		8309-215-050	1N 4148
D 204		8309-201-013	BA 243
D 301		8309-510-197	BB 204 GR
D 302		8309-510-197	BB 204 GR
D 303		8309-510-197	BB 204 GR
D 304		8309-510-198	BB 204 BL
D 305		8309-215-050	1N 4148
D 401		8309-214-114	TD 129
D 402		8309-214-114	TD 129
D 501		8309-001-107	1 N 60
D 502		8309-721-015	ZD 276
D 503		8309-215-050	1N 4148
D 603		8309-001-017	AA 143
D 604		8309-215-021	1N 4001
D 605		8309-200-018	BAV 19
D 751		8309-001-017	AA 143
D 752		8309-001-017	AA 143
D 753		8309-215-050	1N 4148
D 754		8309-215-050	1N 4148
D 803		8309-198-042	BAT 42
D 804		8309-198-042	BAT 42
D 805		8309-198-042	BAT 42
D 806		8309-198-042	BAT 42
D 807		8309-198-042	BAT 42
D 809		8309-215-050	1 N 4148
D 810		8309-198-042	BAT 42
C 811		8309-215-050	1N 4148
D 812		8309-215-050	1N 4148
D 813		8309-215-050	1N 4148
D 814		8309-215-050	1N 4148
D 815		8309-215-050	1N 4148
D 817		8309-215-050	1N 4148
D 818		8309-215-050	1N 4148
D 901		8309-215-021	1N 4001
D 902		8309-210-125	SKE 1-02
D 903		8309-210-125	SKE 1-02
D 904		8309-210-125	SKE 1-02
D 905		8309-210-125	SKE 1-02
D 906		8309-215-115	SE 15
D 907		8309-215-050	1N 4148
D 908		8309-215-050	1N 4148
D 909		8309-215-050	1N 4148
D 910		8309-215-021	1N 4001
ST 301		8309-680-512	BZV 46/62/VO
ST 401		8309-701-081	BZX 75/C1/V4
ST 501		8309-680-512	BZV 46/C2/VO
ST 502		8309-680-512	BZV 46/C2/VO
ST 601		8309-680-512	BZV 46/C2/VO
ST 602		8309-720-068	ZD 6,8 C
ST 901		8309-707-020	ZPD 10

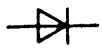
Pos. No.	Fig. No.	Bes
		
D 801		83
D 802		83
		
C 278		19
C 303		19
C 307		19
C 313		19
C 318		19
C 403		19
C 405		19
C 672		84
C 716		19
C 814		19
C 857		19
C 907		84
		
R 258		87
R 359		87
R 507		87
R 513		87
R 521		87
R 632		19
R 635		19
R 649		19
R 674		87
R 676		87
R 679		87

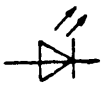
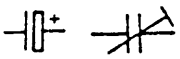
Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
T 604		8302-200-551	BC 549 C
T 605		8302-200-551	BC 549 C
T 607		8302-202-557	BC 560 C
T 608		8302-200-5-8	BC 548 C
T 609		8302-200-169	BC 338-25
T 610		8302-400-103	GC 269
T 611		8302-202-538	BC 548
T 612		8302-210-532	BD 533 L
T 613		8302-210-535	BD 534 L
T 751		8302-202-5-8	BC 548 B
T 703		8302-220-----1	BF 441
T 704		8302-220-----1	BF 441
T 705		8302-222-5-0	BF 440
T 706		8302-200-550	BC 549 B
T 752		8302-200-555	BC 558 A
T 753		8302-200-538	BC 548 A
T 754		8302-202-538	BC 548
T 755		8302-202-538	BC 548
T 801		8302-293-079	BPX 81 III/IV
T 802		8302-293-079	BPX 81 III/IV
T 803		8302-202-5-8	BC 548 B
T 804		8302-200-169	BC 338-25
T 805		8302-202-5-8	BC 548 B
T 806		8302-200-171	BC 338-40
T 807		8302-200-175	BC 328-40
T 808		8302-200-171	BC 338-40
T 809		8302-200-175	BC 328-40
T 810		8302-202-5-8	BC 548 B
T 811		8302-202-5-8	BC 548 B
T 812		8302-202-5-8	BC 548 B
T 813		8302-202-5-8	BC 548 B
T 814		8302-202-5-8	BC 548 B
T 815		8302-202-5-8	BC 548 B
T 816		8302-202-5-8	BC 548 B
T 817		8302-202-5-8	BC 548 B
T 818		8302-202-5-8	BC 548 B
T 319		8302-202-5-8	BC 548 B
T 821		8302-200-5-8	BC 548 C
T 822		8302-200-5-8	BC 548 C
T 823		8302-200-5-8	BC 548 C
T 824		8302-200-5-8	BC 548 C
T 901		8302-200-5-8	BC 548 C
T 902		8302-212-53-	BD 534 G
T 903		8302-200-[illegible]	BC 328
T 904		8302-210-536	BD 826-16
T 905		8302-202-558	BC 558
T 906		8302-210-532	BD 533 L
T 907		8302-202-538	BC 548
T 908		8302-200-5-8	BC 548 C
T 909		8302-200-5-8	BC 548 C

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
D 101		8309-215-050	1N 4148
D 102		8309-215-050	1N 4148
D 103		8309-215-050	1N 4148
D 104		8309-215-050	1N 4148
D 201		8309-510-608	BB 609 B
D 202		8309-510-608	BB 609 B
D 203		8309-215-050	1N 4148
D 204		8309-201-013	BA 243
D 301		8309-510-197	BB 204 GR
D 302		8309-510-197	BB 204 GR
D 303		8309-510-197	BB 204 GR
D 304		8309-510-198	BB 204 BL
D 305		8309-215-050	1N 4148
D 401		8309-214-114	TD 129
D 402		8309-214-114	TD 129
D 501		8309-001-107	1 N 60
D 502		8309-721-015	ZD 276
D 503		8309-215-050	1N 4148
D 603		8309-001-017	AA 143
D 604		8309-215-021	1N 4001
D 605		8309-200-018	BAV 19
D 751		8309-001-017	AA 143
D 752		8309-001-017	AA 143
D 753		8309-215-050	1N 4148
D 754		8309-215-050	1N 4148
D 803		8309-198-042	BAT 42
D 804		8309-198-042	BAT 42
D 805		8309-198-042	BAT 42
D 806		8309-198-042	BAT 42
D 807		8309-198-042	BAT 42
D 809		8309-215-050	1 N 4148
D 810		8309-198-042	BAT 42
D 811		8309-215-050	1N 4148
D 812		8309-215-050	1N 4148
D 813		8309-215-050	1N 4148
D 814		8309-215-050	1N 4148
D 815		8309-215-050	1N 4148
D 817		8309-215-050	1N 4148
D 818		8309-215-050	1N 4148
D 901		8309-215-021	1N 4001
D 902		8309-210-125	SKE 1-02
D 903		8309-210-125	SKE 1-02
D 904		8309-210-125	SKE 1-02
D 905		8309-210-125	SKE 1-02
D 906		8309-215-115	SE 15
D 907		8309-215-050	1N 4148
D 908		8309-215-050	1N 4148
D 909		8309-215-050	1N 4148
D 910		8309-215-021	1N 4001
ST 301		8309-680-512	BZV 46/62/VO
ST 401		8309-701-081	BZX 75/C1/V4
ST 501		8309-680-512	BZV 46/C2/VO
ST 502		8309-680-512	BZV 46/C2/VO
ST 601		8309-680-512	BZV 46/C2/VO
ST 602		8309-720-068	ZD 6,8 C
ST 901		8309-707-020	ZPD 10

Pos. No.
D 8(
D 8(
C 2[illegible]
C 3(
C 3(
C 31
C 31
C 4(
C 4(
C 67
C 71
C 81
C 85
C 90
R 25
R 35
R 50
R 51
R 52
R 63
R 63
R 64
R 67
R 67
R 67

For Service Manuals
MAURITRON SERVICES
8 Cherry Tree Road, Chinnor
Oxfordshire, OX9 4QY.
Tel (01844) 351694
Fax (01844) 352554
email:- mauritron@dial.pipex.com

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
			
D 101		8309-215-050	1N 4148
D 102		8309-215-050	1N 4148
D 103		8309-215-050	1N 4148
D 104		8309-215-050	1N 4148
D 201		8309-510-608	BB 609 B
D 202		8309-510-608	BB 609 B
D 203		8309-215-050	1N 4148
D 204		8309-201-013	BA 243
D 301		8309-510-197	BB 204 GR
D 302		8309-510-197	BB 204 GR
D 303		8309-510-197	BB 204 GR
D 304		8309-510-198	BB 204 BL
D 305		8309-215-050	1N 4148
D 401		8309-214-114	TD 129
D 402		8309-214-114	TD 129
D 501		8309-001-107	1 N 60
D 502		8309-721-015	ZD 276
D 503		8309-215-050	1N 4148
D 603		8309-001-017	AA 143
D 604		8309-215-021	1N 4001
D 605		8309-200-018	BAV 19
D 751		8309-001-017	AA 143
D 752		8309-001-017	AA 143
D 753		8309-215-050	1N 4148
D 754		8309-215-050	1N 4148
D 803		8309-198-042	BAT 42
D 804		8309-198-042	BAT 42
D 805		8309-198-042	BAT 42
D 806		8309-198-042	BAT 42
D 807		8309-198-042	BAT 42
D 809		8309-215-050	1 N 4148
D 810		8309-198-042	BAT 42
D 811		8309-215-050	1N 4148
D 812		8309-215-050	1N 4148
D 813		8309-215-050	1N 4148
D 814		8309-215-050	1N 4148
D 815		8309-215-050	1N 4148
D 817		8309-215-050	1N 4148
D 818		8309-215-050	1N 4148
D 901		8309-215-021	1N 4001
D 902		8309-210-125	SKE 1-02
D 903		8309-210-125	SKE 1-02
D 904		8309-210-125	SKE 1-02
D 905		8309-210-125	SKE 1-02
D 906		8309-215-115	SE 15
D 907		8309-215-050	1N 4148
D 908		8309-215-050	1N 4148
D 909		8309-215-050	1N 4148
D 910		8309-215-021	1N 4001
ST 301		8309-680-512	BZV 46/62/VO
ST 401		8309-701-081	BZX 75/C1/V4
ST 501		8309-680-512	BZV 46/C2/VO
ST 502		8309-680-512	BZV 46/C2/VO
ST 601		8309-680-512	BZV 46/C2/VO
ST 602		8309-720-068	ZD 6,8 C
ST 901		8309-707-020	ZPD 10

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
			
D 801		8309-909-258	LD 261 III/IV
D 802		8309-909-258	LD 261 III/IV
			
C 278		19799-306.97	7/35 pF
C 303		19799-303.94	3,5/13 pF
C 307		19799-303.97	3,5/13pF
C 313		19799-303.97	3,5/13pF
C 318		19799-301.91	2/6pF
C 403		19799-304.97	4,5/20pF
C 405		19799-306.97	7/35pF
C 672		8415-169-150	2200µF/25V
C 716		19799-422.91	3/10pF
C 814		19799-316.91	7/35pF
C 857		19799-335.15	10/40pF
C 907		8446-796-115	6800µF/35 V
R 258		8790-909-105	50 Ω
R 359		8790-909-065	100 KΩ
R 507		8790-909-004	500 kΩ
R 513		8790-909-004	500 KΩ
R 521		8790-909-059	47 KΩ
R 632		19703-099.08	500 KΩ
R 635		19703-100.08	200 KΩ
R 649		19703-098.08	100 KΩ
R 674		8705-269-245	68 Ω
R 676		8790-209-138	2,2 KΩ
R 679		8765-097-017	4,7 Ω

Bedienungsanleitung	Operating instruc
15053-941.01	15053-941.01

Fig. No.	Bestell-Nr./Part No.	Benennung Description
	8309-909-258	LD 261 III/IV
2	8309-909-258	LD 261 III/IV
	19799-306.97	7/35 pF
3	19799-303.94	3,5/13 pF
7	19799-303.97	3,5/13pF
3	19799-303.97	3,5/13pF
3	19799-301.91	2/6pF
3	19799-304.97	4,5/20pF
3	19799-306.97	7/35pF
	8415-169-150	2200µF/25V
	19799-422.91	3/10pF
	19799-316.91	7/35pF
	19799-335.15	10/40pF
	8446-796-115	6800µF/35 V
	8790-909-105	50 Ω
	8790-909-065	100 KΩ
	8790-909-004	500 kΩ
	8790-909-004	500 KΩ
	8790-909-059	47 KΩ
	19703-099.08	500 KΩ
	19703-100.08	200 KΩ
	19703-098.08	100 KΩ
	8705-269-245	68 Ω
	8790-209-138	2,2 KΩ
	8765-097-017	4,7 Ω

Pos. No.	Fig. No.	Bestell-Nr./Part No.	Benennung Description
R 684		8766-701-041	47 Ω
R 685		8765-097-025	10 Ω
R 686		8765-097-025	10 Ω
R 687		8700-229-011	2,7 Ω
R 707		19703-110.08	10 KΩ
R 713		8790-209-005	10 KΩ
R 819		8765-097-017	4,7 Ω
R 862		8790-009-024	100 KΩ
R 896		8700-009-077	8,2 Ω
R 897		8700-009-077	8,2 Ω
R 901		8700-229-001	1 Ω
R 914		15045-093.00	47 Ω
R 918		8790-209-009	100 KΩ
R 922		8765-097-017	4,7 Ω
R 916		8765-299-065	470 Ω
Si 1		8315-612-002	315 mA
Si 2		8315-620-003	2 A
Si 3		8315-620-003	2 A
Si 4		8315-610-025	200 mA
Si 5		8315-614-025	500 mA
Si 6		09623-332.04	
LA 1		8316-113-102	6/7V/30 mA
LA 2		8316-113-102	6/7V/30 mA
LA 3		8316-113-102	6/7V/30 mA
LA 4		8316-453-003	6/7V/80 mA

Bedienungsanleitung
15053-941.01

Operating instruct
15053-941.01

009485

GRUNDIG SATELLIT INTERNATIONAL 650

John Waite

The Grundig Satellit International 650 is a very versatile receiver being equally at home as a high quality portable or as a communications receiver. The frequency coverage includes l.w., m.w., v.h.f. f.m. and short wave from 1.6MHz to 30MHz.

My first surprise when the International 650 arrived was the size of the parcel which was about 600 x 340 x 270mm. Although there was plenty of protective packaging, the receiver itself was quite large at 504 x 242 x 202mm.

Once I had unpacked it, I sat down and read the manual, a good quality, A4 booklet with 54 pages. As is usual with this type of receiver, the manual was multilingual with six pages devoted to each language. Despite this seemingly small allocation, the features of the International 650 were explained adequately. There was also a fold-out sheet inside the front cover which could be referred to in order to locate the various controls.

I was delighted to see that the International 650 was able to work with a wide range of power sources. Probably the most common selection for this size of radio would be to use mains power. The International 650 was very well equipped being able to handle 110-127V and 220-240V a.c. at 50 or 60Hz. This should enable the receiver to be used almost anywhere in the world without any difficulties, which is a big plus point for the traveller. There was even a neat compartment next to the battery section which could be used to store the mains lead, though it wasn't quite big enough to hold the lead and a 13A mains plug!

If you enjoy working portable, there are yet more options as the International 650 can either operate from an external 10-16V d.c. supply or from internal batteries. When using batteries you have two options - either fit six R6 cells in the battery compartment or use a Dry-fit lead-acid battery. This latter option is very unusual on domestic equipment, but can be extremely useful as it allows extended periods of operation.

Regardless of which power source you use you will need to fit two R6 cells to provide back-up power for the clock and memories.

Having sorted out the power the next stage was to set-up an antenna. The simplest solution of course is to use the internal antennas which comprised the usual feritte rod for l.w. and m.w. and a 1440mm telescopic antenna for v.h.f. and the short waves. An interesting point with this antenna is that there is a stop at 810mm which is designed to be used for v.h.f. reception whilst the full length is used for short wave listening. Although these antennas work well within their limitations, best performance, on short wave can only really be obtained by using an external antenna. The connection for the external antenna could either be made via an unusual (at least in the UK) DIN 45325/75 type or alternatively wire connectors for antenna and earth.

The main benefits of using an external antenna are the potential reduction in interference, achieved by careful placing of the antenna, combined with increased signal strength. In order to realise these benefits, it is essential that the internal antenna is disconnected when using an external antenna. This is achieved on the International 650 by operating a small push-button next to the antenna sockets which selects either internal or external antenna. When receiving stations on l.w. it can be useful to be able to rotate the antenna for best reception. The sheer size and weight of the International 650 make it impractical to turn the receiver around so Grundig have fitted an additional socket and switch on the front panel marked DF to allow the connection of an optional, external l.w. directional antenna. This is a rather neat solution to this problem.

In addition to these basic connections the International 650 has one or two other useful features. The first is the provision of phono jacks on the rear panel for line in and out, this is matched with a DIN socket which is configured for connection to a tape recorder or record player. These sockets make it very easy to make recordings off air. One other feature is an external speaker socket which is designed for a 4Ω speaker, though it will work quite happily with the more common 8Ω types. Once an external speaker has been connected you can switch between internal, external or both speakers using a three way switch on the front panel.

Operation

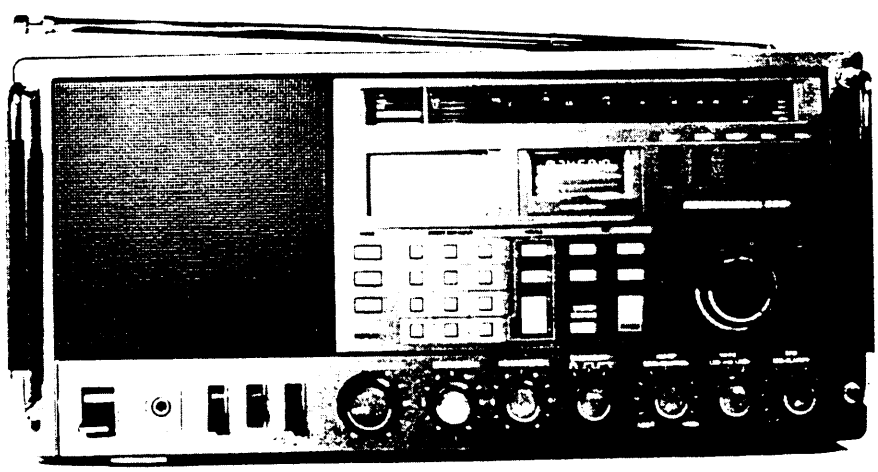
The front panel is positively bristling with controls and buttons, 44 in all!. The power switch has three positions, centre off, down for on and up for timer. The timer option is quite versatile as it allows up to three separate on - off sequences to be programmed using the internal clock.

There is a choice of three speaker options, external speaker only, internal speaker and internal speaker with tweeter. I must say it's unusual to have a switchable tweeter but this could of course be useful when listening to poorer quality signals where disabling the tweeter will reduce the hiss.

If you're using the International 650 with batteries, there is a useful battery check switch on the front panel which when ooperated gives an indication of the battery condition on the S meter. This feature has been well thought out as there are two markings on the meter one for use with dry cells and the other for Dry-fit lead acid batteries. The second position on this centre weighted switch turns on the panel illumination, making the frequency scales and S meter very easy to read. If you are using mains power, where economy is not so important, the panel illumination remains on permanently.

Separate volume, treble and bass controls are provided to allow the user maximum control of the sound quality, which seems to be a hallmark of Grundig. In addition to providing good control of music on v.h.f. signals, these controls are also very useful on short wave as you can tailor the response to suit the signal. There was also a very useful three position bandwidth control which gave a choice of narrow, wide or extra wide i.f. response. This filtering is very useful for reducing interference from adjacent stations on the crowded short wave bands.

No short wave communications receiver would be complete without the ability to receive s.s.b. and c.w. transmissions and the International 650 achieves this using the familiar b.f.o. The selection of s.s.b. is done with a three position rotary switch on the front panel which caters for a.m., l.s.b. and u.s.b. The b.f.o. tuning control is immediately to the right of this control has has quite a wide range. This wide b.f.o. tuning range is



GRUNDIG SATELLIT INTERNATIONAL 650

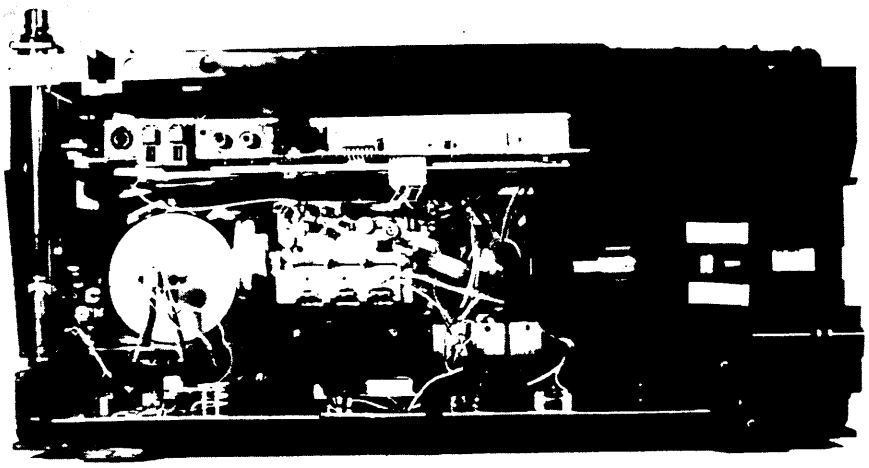
necessary as the smallest receiver tuning steps available are 1kHz. From this you can see that a b.f.o. range of at least 1kHz is required to fill in the gaps.

Another useful feature for s.s.b. and c.w. reception was the provision of a manual r.f. gain control. This rotary control can either be turned fully counter clock wise past the click stop for normal automatic gain control or advanced for manual r.f. gain control. Its main use is to reduce the r.f. gain in the presence of very strong signals and thus reduce the risk of internally generated interfering signals.

The final aid to reception was the provision of an automatic noise limiter. This was enabled by a switch on the front panel and was mainly of use on the short wave bands to reduce impulsive interference.

The International 650 was also equipped with an internal clock and timer functions. The provision of a timer can be very useful either as an alarm clock (though you would need a pretty big bedside table!) or for recording programs when you are away from home. The timer can be set for up to three separate on/off sequences during any 24 hour period. Unfortunately these sequences cannot be spread over more than one day. This limitation seems rather a shame as the International 650's clock also has a calendar, so it knows what day it is!

If you happen to own a Grundig tape recorder with remote start/stop facility, you can use a special lead to connect the tape recorder to the radio so that it automatically starts recording when the radio turns on.



Tuning

The International 650 features some interesting and well thought out tuning options. The choice of band was achieved by five pushbuttons on the front panel for l.w., m.w., s.w. and v.h.f. The fifth button was marked AUX and, if selected, allowed an external tape recorder or record player to be played through the International 650's audio stages.

Probably the most common tuning mode is manual and this is accomplished using the large knob on the front panel. The first thing you notice about this knob is that it is of the dual concentric type with the outer controlling the frequency, whilst the inner tunes an r.f. preselector covering the short wave bands. Separately tuned preselectors are something of a rarity these days, though they used to be very popular.

For those who have never come across a preselector, it is simply a set of tuned circuits close to the antenna input which act as a variable band pass filter. The object is to prevent all but the wanted signal from entering the signal processing stages of the receiver. By doing this you help to minimise distortion generated within the receiver. The International 650 displays the pre-selector tuning on a conventional analogue tuning scale which is some 250mm long and is placed at the top of the front panel.

I'm sure many of you are now thinking that in order to tune around the bands you have to tune both the main dial and the preselector. Fortunately, Grundig noticed this problem and have provided a neat solution in the form of a switchable motorised drive for the preselector. The default condition is for the drive to be on and this is indicated by the words AUT PRESEL appearing on the digital frequency display. When in this mode, the pre-selector dial automatically tracks the main tuning frequency. The tracking is not continuous, but follows the main frequency in approximately 50kHz steps. If you want to disable the automatic tracking and return to manual control you simply press the large button in the centre of the tuning knob. Actually, I found the auto-tracking quite fascinating and it's certainly a feature to impress your friends with!

Getting back to the tuning options, the frequency is shown by a five digit digital liquid crystal display near the centre of the front panel. The digits on this display are 16mm high so they are very easy to read, even under quite difficult lighting conditions. The resolution of the display was 1kHz on l.w., m.w. and s.w. whilst on v.h.f. it was reduced to 10kHz.

The second tuning option is to use direct frequency entry via the numerical keypad, again on the front panel. This method is particularly useful for large frequency changes and involves entering the most significant digits of the required frequency and pressing the red frequency set button. Like most modern receivers, the International 650 automatically inserts the trailing zeros.

Most modern receivers with digital tuning feature some form of frequency memory and the International 650 is no exception. In this case there are a total of 60 memories called station stores which are allocated to particular bands as shown here: l.w. 4 memories; m.w. 8 memories, v.h.f. 16 memories and s.w. 32 memories. This seems to be a pretty reasonable allocation which should prove adequate for most listeners. Entering a frequency into a memory was very simple and involved tuning to the required frequency entering the memory number on the key pad and pressing STATION STORE button. Unlike many receivers, there was no facility provided to scan through the memories which may dissappoint some readers.

Performance

Once I had made room for the International 650 in the shack it did perform remarably well. I mentioned earlier that Grundig are well know for producing portable radios with good sound quality and this was born out with the International 650. Fairly obviously, the best sound quality was obtained when listening to a local v.h.f. f.m. broadcast station. The 150mm speaker combined with the large case meant that the bass response was very healthy without being too boomy. The use of a separate tweeter also added clarity to the higher frequencies. When listening to a.m. broadcast stations I found it very easy to obtain optimum quality by careful adjustment of the bandwidth and tone controls. The bandwidth control was also very effective for reducing interference from adjacent stations.

The sensitivity was also very good and I was pleasantly surprised by the performance on the internal antenna. When connected to an external antenna, in my case a nest of dipoles covering from 3.5MHz to 28MHz, the performance was also very good. I did find that when used with an efficient external antenna system it was very easy to overload the receiver and cause all manner of spurious signals to appear. The newcommer can easily confuse this with appently good performance as there appears to be more stations on the band, the snag is that they are birdies. The solution to this problem is either to include a switchable attenuator in the antenna lead or to revert to manual r.f. gain control. The snag with using the manual gain control is that you experience the full effect of any fading and this can make to station very difficult to listen to. I think a receiver of this quality really ought to have an attenuator built in as standard. Despite my criticism, if you

GRUNDIG SATELLIT INTERNATIONAL 650

use the International 650 with its internal antenna or a relatively short external antenna you will rarely have a problem.

Moving on to s.s.b. reception, I tried the International 650 on various amateur and commercial signals and managed to resolve all signals with very little difficulty. I did find that I needed some practice before I could resolve all signals. The main problem was the 1kHz main tuning steps as it was very easy to tune either side of the signal but not quite hit the right point. The secret was to use the wide tuning range of the b.f.o. to fill-in the gaps betwen the 1kHz slots. The recovered audio quality was good when receiving strong signals but tended to be rather warbly with weak signals, though they were still quite readable. I found that the narrow bandwidth position was best suited to s.s.b. reception.

As the International 650 is capable of receiving utility transmissions, the next operation was to check c.w. RTTY, FAX and Packet data modes. The reception of these modes is very similar to receiveing s.s.b. but you need some additional decoding equipment. The one exception to this of course is c.w. which can be read by ear. I found that it was very easy to produce a good stable note using the b.f.o., which was fine for human or computer c.w. decoding.

Moving on to RTTY, I connected-up my BBC B computer, G3LIV terminal unit and G3WHO software to the audio output available from the DIN socket on the rear panel. The provision of this socket is particularly useful to the utility listener as the output level is independant of the volume control setting so you can turn the volume right down and still decode RTTY etc. Whilst testing the performance on RTTY I tried all the common frequency shifts of 170Hz, 425Hz and 850Hz and with careful use of the b.f.o. I was able to decode all modes with no particular problems. FAX and amateur Packet reception was also successful using an ICS Electronics FAX-1 and a Siskin Electronics TNC-220.

I found the tuning options to work very well and it was very easy to quickly change frequency by using direct frequency entry. The automatic preselector tuning was quite effective but never seemed to be quite in tune and a small manual adjustment was usually required to give best sensitivity.

One point I did find rather irritating was the two stage tuning control. If the tuning control was moved quickly the control logic selected a higher tuning rate of 3kHz steps on l.w., 5kHz on s.w., 110kHz on v.h.f. On s.w. there was a two stage shift of 11kHz followed by 111kHz. In addition to the higher tuning rate the audio stages are muted. Although this does allow fast and silent frequency changes, I found that the threshold was set far too low and it was very easy to all of a sudden find yourself way off frequency. The problem may have been due to me being too impatient, but I think prospective purchasers should bear this in mind when testing the receiver prior to purchase.

Summary

Although I had a few minor moans, if you fancy a top of the range Grundig then this model is certainly a very capable receiver. The performance on broadcast reception was very good and it has the potential for utility station monitoring, making it a good all round performer. The versatile power supply options are a big plus point and mean that it can operate in a wide range of conditions. I can well imagine the International 650 being used by people living in isolated areas anywhere in the world.

The International 650 is available from any Grundig dealer price £450. My thanks to Grundig UK and Johnsons Shortwave Radio for the loan of the review model.□

Specifications

Frequency Range:	f.m. 87.5 - 108MHz l.w. 148 - 420kHz m.w. 510 - 1620kHz s.w. 1.6 - 30MHz
Filters:	f.m. 3 ceramic. a.m. 2 crystal + 1 ceramic.
Output:	30 watts peak
Power Requirements:	220-240V a.c. 50/60Hz 110-127V a.c. 50/60Hz 10-16V d.c. 6 x R20 cells Grundig Dry-fit lead-acid
Dimensions:	504 (w) x 242 (h) x 202mm (d)
Weight:	8.5kg without batteries.

SERVICES

Subscriptions

Subscriptions are available at £17 per annum to UK addresses and £19 overseas. Subscription copies are despatched by Accelerated Surface Post outside Europe. For further details see the announcement elsewhere in this issue. Airmail rates for overseas subscriptions can be quoted on request. Joint subscriptions to both *Short Wave Magazine* and *Practical Wireless* are available at £28 (UK) and £32 (overseas). Three year subscriptions are also available for SWM at £45 (UK), £50 (overseas).

Components for SWM Projects

In general all components used in constructing *SWM* projects are available from a variety of component suppliers. Where special, or difficult to obtain, components are specified, a supplier will be quoted in the article.

The printed circuit board for the *SWM* Audio Filter, July '87 issue, is available price £2.75. The printed circuit board for the *SWM* Active Weather Satellite Antenna, June '88 issue is available price £4.20. Orders to Short Wave Magazine, Enefco house, The Quay, Poole, Dorset BH15 1PP. Prices of p.c.b.s include VAT and P&P.

Back Numbers and Binders

Limited stocks of most issues of *SWM* for the past ten years are available at £1.50 each including P&P to addresses at home and overseas (by surface mail).

Binders, each taking one volume of the new style SWM, are available price £3.50 plus £1 P&P for one binder, £2 P&P for two or more, UK or overseas. Please state the year and volume number for which the binder is required. Prices include VAT where appropriate.

Orders for p.c.b.s, back numbers, binders and items from our Book service should be sent to **PW Publishing Ltd., FREEPOST, Post Sales Department, Enefco House, The Quay, Poole, Dorset BH15 1PP**, with details of your credit card or a cheque or postal order payable to PW Publishing Ltd. Cheques with overseas orders must be drawn on a London Clearing Bank and in sterling.

Credit card orders (Access, Mastercard, Eurocard or Visa) are also welcome by telephone to Poole (0202) 678558. An answering machine will accept your order out of office hours.